



THE  
AMATEUR  
GUIDE  
IN  
PHOTOGRAPHY



BY

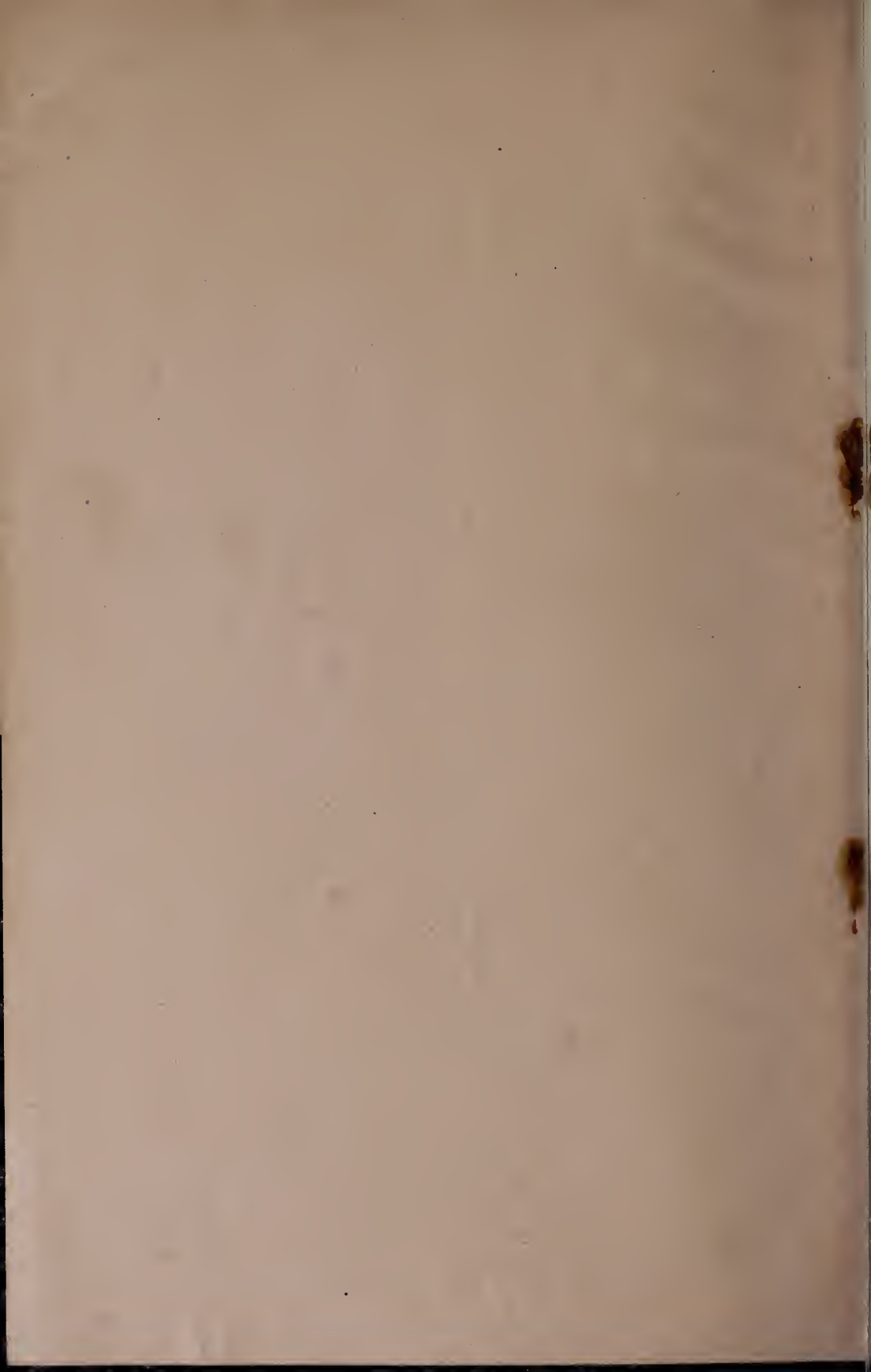
T. H. BLAIR



PUBLISHED BY  
THE BLAIR CAMERA CO.

BOSTON, PHILADELPHIA, CHICAGO

1888

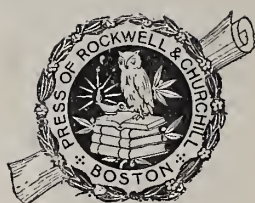


THE  
A M A T E U R  
G U I D E  
IN  
P H O T O G R A P H Y

BY  
T. H. BLAIR

*Revised Edition*

PUBLISHED BY  
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## ❧ PREFACE. ❧



To write and compile a Guide-book in Photography, complete in all its complicated branches and successfully carrying the student through its various processes, is a task of considerable magnitude, and one which requires much study, printer's ink, and paper. To fill this purpose is not the intent of this treatise; it is intended only as a guide to the beginner, and one which will teach in the simplest manner how to produce photographs of the highest excellence.

I have endeavored to treat practically on all subjects attempted, and to choose only such as would be of value in producing photographic pictures. To keep abreast with Photography in its progressive march, the author has found it necessary to remove or change a great portion of the original matter comprising the earlier edition of "The Amateur Guide in Photography," which has enjoyed so great a popularity for the past five years.

To enable this work to act as a "faithful guide," he has solicited and gained the aid of the following gentlemen, well known for their skilful execution in matters of which they write:—

George Eastman, of The Eastman Dry Plate and Film Co., on Printing on Bromide Paper; Contact and Enlargements; Transfertype Paper, how to use it, and the uses to which it can be put; American Films, and directions for their successful use

Silver Printing, by Charles L. Mitchell, M.D., Vice-President of The Blair Camera Co

Photographing Machinery, by Charles W. Lowell, of The Blair Camera Co

These additions, it seems apparent, should greatly increase the popularity of this pioneer effort to aid the Amateur, to say nothing of the attempt at improvement by

THE AUTHOR.

## ❖ INTRODUCTION. ❖



**A**S reliable plates can now be procured, all attempts to prepare them by the Amateur will be found generally to result in an increase of expense and unsatisfactory results. I therefore say nothing on this subject whatever.

In Photography, as in all other arts and sciences, a certainty of success in producing results of excellence cannot be gained except by a careful study of effects and the laws and principles which govern them, combined with a natural love and taste for the pursuit. Thus inwardly equipped, and provided with suitable instruments, reliable sensitive plates, chemicals, etc., there are but few studies or amusements which will prove so beneficial to the Amateur. It creates and educates an eye for the beautiful; by being constantly on the alert for a subject, thus often drawing attention to the grand and picturesque which might otherwise have been passed unnoticed.





# AMATEUR GUIDE

IN

# PHOTOGRAPHY.

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## SELECTION OF TOOLS.

**I**T is a difficult task to advise the intending purchaser what to buy, as the conditions under which the operator will be likely to labor should govern this largely.

One thing more than all others which governs this selection is the amount of money the purchaser desires to invest, as a first-class instrument will always do work which the cheaper grade will, while the cheaper grades will not do that which the first-class are especially designed to do.

In the higher grades of instruments there are also qualities which especially recommend the different styles for specific purposes; for instance, the Champion and the Improved Reversible Back Cameras.

The Champion was built to meet the demand for a Camera having all the adjustments movable with rack and pinion. To accomplish this, it was necessary that the Camera be made heavier, and it is recommended where weight is not so much to be considered as facility of working the different movements; but where the Camera is to be carried much, the advantages gained by the Rack and Pinion adjustments will not compensate for the labor in carrying the extra weight. Lightness and compactness are qualities which, when carried beyond correct proportions, are antagonistic to rigidity and strength. Especially so when the users of Camera and Tripod demand that there must be no braces or tightening screws to adjust, while the apparatus must possess every known improvement, with the capability to do all kinds of work.

In the manufacture of the Improved Reversible Back Cameras, fitted with Feather-weight Holders and Feather-weight or Compact Tripods, The Blair Camera Company feel that they have approached as near as is safe to that line where strength with rigidity and lightness with compactness refuse to combine, until aided by braces and supports, which have been embodied in the English Compact Camera, and I trust I will be pardoned when I point to these as models of compactness, rigidity, and good workmanship.

The Lucidograph is an outfit designed especially for outdoor and general work, compactness and lightness being an important feature. Owing to its

reversing on the tripod to obtain vertical or horizontal negatives, it is not as convenient to use as the camera having Reversible Back Adjusters; but it has no equal for compactness in a camera possessing the advantages it does. I can, therefore, do nothing better than advise the selection of one where the purchaser desires a less expensive outfit than one embracing a Reversible Back Camera.

It must be remembered that the Lucidograph Camera is designed to be used only with a lens focussing at not less than six inches, nor more than ten, taking as an example a  $5 \times 8$  instrument.

## TRIPODS.

On no piece of apparatus connected with photography has there been more experiments tried and thought expended, to improve and condense, than on this important, yet bothersome article. Yet the most satisfactory forms are to-day made on the principle of those constructed ten years ago. The Feather-weight and Compact Tripods are sufficiently rigid for all sizes of cameras up to  $6\frac{1}{2} \times 8\frac{1}{2}$ , above which the Combination should be used.

The English Folding Tripod is a less expensive form; yet very rigid and easily set up. It does not possess the advantage of being adjustable to different heights. It is sufficiently rigid for all sizes of cameras up to  $8 \times 10$ . In the selection of a Tripod, it is wise to select the best.

## PLATE-HOLDERS.

Three styles of this accessory to the Camera are listed, in the attempt to suit the most critical. The English being the most desirable in all sizes above  $8 \times 10$ , and both this pattern and the Blair Patent being somewhat heavier and stronger, but the Feather-weight are much the lighter, and for small sizes the most desirable.

As the Holders cannot be filled, or the Plates which they carry changed, except in a dark room, it will be apparent that a liberal supply of them are desirable.

Six Double Holders carry twelve plates, which will be quite as many as will be likely to be used in a day's outing; and after nightfall the "exposed" plates can be removed, and fresh ones put in, ready for use the day following, or at any time to suit the pleasure of the operator.

## LENSES.

To advise on the selection of a lens is most perplexing, especially so when we daily see evidences of the beautiful working-qualities of each of the standard makes; and as there is such a difference of opinion regarding the different makes of the higher grade of lenses, I refrain from recommending any special make; further than to say that The Blair Camera Company list only the most celebrated. They being the sole agents of the "Orthographic Lenses," they have, as a matter of course, great confidence in their capabilities, and think the most effective method of recommending them is to say they are sent on a ten days' trial.

For landscape viewing, it is a well-conceded fact that there is nothing better than a Single Achromatic Lens, as the expression of perspective is

natural, and it gives exceedingly uniform definition. We have seen many landscape pictures made with them which were all that could be asked for by the most critical; also many interiors, and even portraits, which were in themselves gems; but by the curving of straight lines on the outer edge of the picture they are unfit for this latter class of work. The same curving occurs in landscape views, but as the works of nature are not, as a rule, comprised of straight lines, the distortion is unnoticeable.

## PLATES.

On this subject we might repeat the substance of our remarks on the selection of a high grade of lens, and thus express our sentiments. Our advice is, buy none but those of acknowledged standard, unless warranted by houses in which you have the utmost confidence, as there is no article sold which the purchaser buys so much on his faith in the seller as this. If you are successful with a brand avoid changing, unless you wish to experiment.

## DEVELOPING OUTFITS AND DEVELOPERS.

For those who possess the knowledge or have a friend to advise them, the preferable way is to select such chemicals and accessories as judgment dictates to answer your purpose.

Any of the standard formulas for development will produce most any result which can reasonably be desired, and the wise will adhere to a formula which they understand working with success.

## SILVER-PRINTING AND PRINTING OUTFITS.

The printing and toning of a picture will probably be found more perplexing to the beginners than all the other manipulations combined; but it is one of the most fascinating, and it is therefore commendable to the amateur to practise this interesting branch, if he has the time in which to do it at his command.

The bare necessary articles for printing from a negative are, a printing-frame, sensitized paper, toning solution, and Hyposulphite of Soda; dishes in ordinary domestic use can be made to answer the purpose, but those made for this purpose are, as a matter of course, more convenient.

## BLUE PRINTS.

Printing by using the Ferro-Prussiate Paper is a most convenient and simple method of making proofs of negative; in fact, many have whole collections made by this process, and are admired not only for their novelty, but their beauty. A printing-frame and paper are all that is necessary to make these prints from the negative. The only thing to be done after the print is taken from the frame is to thoroughly wash in water.



In the foregoing advice it will be noticed that, in apparatus, only the goods manufactured by the Company bearing my name are recommended.

Notwithstanding this, I have sought to advise honestly, as I believe the goods designed and manufactured or sold by The Blair Camera Co. to be the best, otherwise I would, as the Company's Manager, aim to adopt the better designs.

Unprejudiced advice cannot therefore be sought of one occupying the position which I do.

The Blair Camera Co. (and of course myself as well) are in business, with the usual hope of reward; and we believe the surest and safest means of gaining this is to deal honestly and frankly, and aid you in deriving the greatest amount of profit from your equipment possible; regardless whether you have followed the advice given, or that of a friend who has chosen goods other than those here recommended.

## THE PICTURE.

The foreground should be somewhat bold and rough, possessing strong contrast, harmoniously blending with the distance, and should be balanced either on one side or the other (and sometimes both) by objects rising much above the horizontal line, and even filling up the entire space of that portion of the picture. In this you must be governed by the general arrangement of the remaining parts. Marine views, as a rule, are unsatisfactory, unless made instantaneously, from the fact that the contrasts in the water are lost by its motion, and the strength of distant objects untruthfully weakened by atmospheric effect. The picture, therefore, presents a flat, cold appearance, void of light and shade; but when combined with strong, bold landscapes, they become the most beautiful pictures.

Gray rocks, old logs, stumps, and similar objects give pleasing contrasts, and add greatly to the depth and brilliancy of otherwise smooth fields and plains.

Probably the best subjects for photographic pictures are such as old ruins, churches overgrown with ivy, cottages surrounded with shrubbery and twining plants, etc. The new and bare walls of a costly residence present but little charm in a picture, except to relatives and favored friends of the proprietor. In taking a photograph of buildings it is best to have the sun at your back, slightly to your left or right; this gives the front in strong light with deep shadows. Photography in the field should seldom be practised between the hours of 11 A.M. and 2 P.M., as the position of the sun leaves no shadows, except directly underneath objects. It is a difficult task to make a picture with the sun directly in your face, for two reasons: 1st. The sun striking in the lens will cause a reflection, which will so diffuse the image as to "fog" the plate and also produce what is photographically called a "ghost." 2d. You get in your picture the dark side of all objects which should be most prominent, and thereby lose detail in them, besides being likely to produce a flat, unartistic picture as a result. As a rule, the best effects are obtainable when the sun is about two hours from the meridian, and is to your right or left; the shadows are then strong and brilliant, the sweeping cross-lights add to the perspective and give "snap" and vigor to the picture, which you are not likely to get with the sun at the meridian or at your back. The choice in position from which to take the picture, and the illumination, are the chief points in landscape photography, and in these the taste of the operator will

show most prominently, and characterize his works with a less or greater degree of excellence. Take plenty of time, and exert your limbs to find the point favoring it most. Objects which do not harmonize with the character of the scene had better be avoided, or, if convenient, removed. A small twig very near the camera may turn out to be a "mighty log" in the picture. At this stage, and before leaving the subject, I will give you verbatim a few rules taken from a "Treatise on Photography," by Capt. W. DeW. Abney, which, he says, should be observed in the composition of a picture, though it must never be forgotten that a rigid adherence to them at all times is impossible:—

1. If the object of interest be in the foreground, its base should occupy a position of from  $\frac{1}{4}$  to  $\frac{1}{3}$  the height of the picture; if it be in the distance, its base should be about  $\frac{1}{3}$  way up the picture.

2. In a general landscape the horizon lines should occupy a position about  $\frac{1}{3}$  way from the top or the bottom of the picture; with the latter a cloud negative will probably be required.

3. It is advisable that the general line of a picture should run a diagonal or take a pyramidal shape.

4. A long, obtrusive line should never be permitted to intersect the picture; it should be broken up as far as possible.

5. A picture should never be cut in two by a dark object against a light background, or by a light object against a dark background.

6. If the general features of a picture have a wedge-like form, care should be taken that the wedge is supported near the point, in order to give the idea of stability.

7. The general lines of a picture should be balanced by opposing lines, for the same reason as that given in Rule 6.

8. A large patch of one approximately uniform tint is distasteful to the eye, and should be broken up if possible.

9. "The object of interest should be pictorially focussed by a general sweep of light (if it be a dark object), or of shadow (if it be a light object), thus causing the eye to fall naturally upon it.

10. Avoid monotony, whether in *constant* repetition of lines, lights, or shades, and never allow a picture to be symmetrical on the right and left of its centre. A repetition of a high light once or twice in a *lower tone* is, however, much to be recommended.

The inexperienced operator must not, in his first attempts, expect to produce results equal to the student of years, who has met with many failures before gaining his present knowledge of *chiaro-oscuro* and power of transforming the scene before him into a composition which will give the most pleasing results, but should study the points wherein his pictures excel yours, and in your next efforts adopt such as will assist you. Neither should he feel discouraged should he meet with failures. In photography such will always occur, and the most advisable course is to "try again," and find out, if possible, the cause of your ill-luck.

I have here given a very brief outline of the rules and principles by which you may be aided. For those desiring further information and deeper study I cannot do better than to refer them to the excellent work of H. P. Robinson, entitled "Pictorial Effect in Photography."

## PHOTOGRAPHING INTERIORS.

One of the great difficulties in this class of work, especially private apartments and rooms of limited dimensions, is in getting sufficient distance to embrace the combining points of interest, — for instance, a drawing-room or library of about equal dimensions: on one side rises the ornamental mantel with corresponding furniture arranged at its foot; opposite is the richly-draped window, on each side of which hangs the family portraits; at the further end is the bay-window, the draperies of which are dark brown. Bathed in sunlight, streaming in the windows from the right, are white marble statues. Here we have the most brilliant contrasts, and to the eye presents a handsome scene; but can it be photographed as such? Let us refer to the camera. The first and about the only visible objects are the window statues and streaming sun; all others are in the darkest shade. To attempt to take both sides (which are of equal importance), we get only the farther end of each, owing to the inability of our lens (which cannot turn around with its eye as do we). But let us try a plate; the right time for exposure being decided upon, we govern ourselves accordingly, and, when completed, we retreat to our dark-room and commence development; the developer is on but a short time before the window flashes out bold and strong, continuing to grow more intense; and when sufficient detail has been obtained in the darker parts it has changed to an opaque mass. The reasons are plain. While the interior required the prolonged exposure suggested under that heading, the small views seen through the window required only sufficient for a landscape, and was therefore overtired a hundred times or more, and in printing would be but a white mass, while the interior might have suffered even from under-exposure. This is photography at random. Now let us proceed, and with manipulation (which only care, judgment, and experience can best teach) attempt to overcome the deficiencies of "our art," and make the best of our limited quarters. 1st. As we cannot take the whole of the room in one picture, let us make two; by so doing we get both sides in full, which will bring the bay-window near one corner of the picture. We therefore place the camera at one side of the room, or maybe the opposite corner, arrange our furniture with care, having no very large objects in front of the camera; next close the blinds to the windows in front (the bay) and darken with black material, being careful that no light streaks show. The bay-window is now enveloped in shade, as are also the statues, and the light is from only one source, namely, the window at the side (should the sun be shining in this also it might be advisable to draw down the *light* shade). Less light being admitted into the room, we will now lengthen our exposure accordingly; the exposure having been made, we recap the lens, carefully remove the dark material, open the shutters, and expose just sufficient for a landscape under like circumstances. Upon development we find that the interior and exterior develop in harmony, and although, when printed, the latter will be lighter, still the stronger outlines of the landscape are not lost. This is one of the "tricks," and serves to show that photography is not capable of embracing all that the eye observes without the aid of artifice. By these means, and by a little careful study and thought, very pretty effects can be obtained. Great care must be taken not to jar the instrument in capping and uncapping the lens, as it will make a double impression of the lighter objects. Corners and dark parts of the room should be illuminated as the means at hand will



best allow, also heavy shadows where detail is wanted. A mirror can often be used to good advantage in reflecting light into such places, keeping the reflector moving so as to leave no outlines of it. If individuals are to be included, let them be placed a good distance from the camera, and assume some easy position in which they are the least likely to move.

## GROUPS.

There is no branch of photography which offers more opportunities for passing a pleasant hour with familiar souvenirs as a result than this; the excellence of which will depend largely on the operator, subjects, and artistic treatment thereof. It is one on which much has been and can be written, more authentic and interesting than anything original from my pen. I will, therefore, again refer you to the work of Mr. Robinson, pp. 93-98.

## PORTRAITURE.

When the amateur, possessing only the facilities usually at hand in ordinary lighted rooms, attempts to make portraits which will equal those made by the professional in points of effective posing, lighting, and arrangement of accessories, he will doubtless be disappointed in the results of his efforts; but if he aims to produce pictures simple in arrangement, truthful in point of likeness, and possessing originality of treatment, photography offers a field which is sufficiently extensive for the full play of the most ambitious in this direction.

It is quite impracticable to give, in this treatise, directions which will enable the beginner to at once produce pictures which are likely to meet with the approval of the critical; but I trust that a few suggestions and simple rules, here added, will aid many to repeat their efforts and study until they can even excel the production of the professional photographer, especially from an artistic point of view.

Until the operator has had sufficient practice to judge of the style of background most in keeping with the face or figure he is to photograph, it is the best plan to adhere to as plain a surface as can be had; the soft, neutral tints of a plain wall are well suited for this purpose. If figured backgrounds must be used, the subject should be placed some distance from them, so that the background will be out of focus and appear indistinct, and thus softer in the picture.

One great difficulty which will be encountered in "Portraiture at Home" will be found to be heavy, deep shadows, especially so in rooms lighted only from one side, or in those furnished or draped with dark material; therefore, reflectors will be found necessary on the shaded sides of the faces. These must be used with care, and should not be placed too near the subject, or the direct reflection will be noticeable.

The effect of the lighting in the picture should always be from one direction (except in case where it is an object of the operator to show reflected light). White papers or sheets placed on the floor (in cases where the picture is to be a bust or half length, and they will not be included in the picture), as well as placed on the walls or chair, on the shadow side of the subject, soften the shadows very greatly.

In making bust pictures the lens should, as a rule, be about on a level with the chin. In full or half length it should be somewhere nearly opposite the chest of the subject; but this is a matter in which deviations from this rule can be made in opposite direction, and with good effect, to favor different subjects, as a little experience will readily show.

If the source of light is from one or two side-windows only, the subject should be at least four or five feet from the window, into the interior of the room, and a foot or two beyond the most distant window.

Regarding the position of the subject, the operator must be governed by his own taste, or such information as books of instruction on figure-drawing or painting will give him, as anything that I should write on the subject would be only such as persons of ordinary intelligence would put in practice from suggestions gleaned in seeing the human form in every-day postures. The head, figure, or group, whichever it may happen to be, should not be made too large, or to fill the plate so that the picture looks crowded.

The length of time of exposure will vary in this class of work greatly, and it is useless to give any rule to follow; even in the most favorably lighted room the exposure will require to be many times greater than in the open air. Owing to the liability of the subject moving, it is desirable to make the exposure as short as possible; therefore, a rapid lens should be selected for this class of work, and a large-size diaphragm used.

Portraits are most easily made in the open air, as they can be instantaneously exposed, and thus the liability of their being spoiled by the moving of the subjects avoided; but the results are likely to appear flat and without well-defined high lights and shades, which expresses shape, and the true and characteristic lines of the features.

Subjects should be allowed to assume natural and easy attitudes, and where a prolonged exposure is to be made, positions in which there is the least liability to move preferred, other advantages being equal.

The Flash Light (so called) has many advantages for Portraiture, and will doubtless be developed very greatly in this direction before the lapse of many months. The same general principles which are given to be followed when lighting from a window, hold good with this light; but the advantage of being able to change the position of the source of light at will is very great.

Making exposures with the so-called "Detective Camera" is rapidly growing in popularity, but evolves no new methods, therefore requires no suggestions here; the treatment of the negative after the exposure being the same as in any other method of exposing the plate in the camera.

## PHOTOGRAPHING MACHINERY.

BY CHARLES W. LOWELL.

Machinery, upon leaving the manufacturer's hands, is usually in a poor condition to be photographed. The priming or glossy paint commonly used, and usually of the most non-actinic colors, renders a strong contrast between light and shade, and does not give an even effect.

If the machine to be photographed is constructed largely of smooth-finished and tooled metal, it should be wiped clean of any oil or paint, and the unfinished castings painted a mat or dull gray color, avoiding anything which will leave a glossy or varnished surface to reflect the high light.



Machinery made almost entirely of unfinished castings should be finished as smooth as possible, and coated with a quick-drying paint, made by mixing white lead with lamp-black and thinning with turpentine,—but with as little of the latter as possible,—and a small quantity of Japan as dryer.

The color should be of a light slate or drab, and present a dead surface when dry. Any inequality in the surface may be stopped up or smoothed over with putty. Where a machine is already set up and in use, it may not be convenient to use the above paint, in which event the following may be used as a substitute, which is easily wiped off: Mix whiting and lamp-black with sour beer, adding a small quantity of glue-sizing to give it body.

Any machine painted a dead or glossy dead black will lack in shadows and detail of construction. Bright metal parts finished, should not be painted at all.

The light is a very important matter in obtaining good views of machinery. Avoid direct sunlight upon any part, and aim to get an even illumination all over. Where necessary to bring out detail of parts, shaded from light above, sheets of white paper may be placed in such positions, beneath or at one side, as will reflect light upon the desired points.

When convenient, a background composed of white cotton cloth stretched on a wooden frame can be used to advantage, as it will bring out the detail and outline of entire machine, thereby facilitating the painting-out process, when used. Of course, if the article to be photographed is of a light color, a dark background would be preferable.

Oftentimes, in focussing the image, it is difficult to find a desirable standpoint; either there is a lack of space to retire far enough from the object, or it is too high. Where there is a lack of room, as in this case, a wide-angle lens will be found most desirable to use.

However, to make the most satisfactory view of a machine of any large proportions, a long-focus lens, a size or two larger than that of plate used, is desirable, as much space as possible being placed between object and camera.

In a machine of any height it would be well to have the lens as nearly on level with centre of machine. Anything low, or setting close to the floor, the camera should be lowered correspondingly. When there is any great length to machine, avoid too much of an angle when focussing it from an end, as the end nearest the camera will be larger in proportion to that at a distance; thus removing the camera at a distance from the entire object gives a more natural view.

Slow plates,—lens well stopped down,—long exposure, and moderate development tend to produce the best results in making photographs of machinery.

## THE TRIPOD.

In field-work all forms of cameras require mounting on some stand or elevation, to bring the view it embraces to a height corresponding with the eye, and to give ease in operating. For this purpose the well-known “tripod” is used. In it the features most desirable are facilities for adjusting it to a proper height, rigidity when set up for use, and compactness in transportation.

## DIRECTIONS FOR USING THE CAMERAS.

The process of adjustment is so simple that the subject requires but little explanation; but, for the benefit of those without knowledge of its use and construction, I append the following:—

“In most all forms of cameras manufactured at present the principles of attaching the ground glass and plate-holder is similar, although they vary in the form of attachment used, the idea being, in all cameras, to firmly adjust the plate-holder so that the sensitive plate to be exposed will occupy the same position as that occupied by the ground glass when the image was focussed upon it, and, at the same time, make the interior of the camera light-tight.

“Notwithstanding this, it may be found desirable to explain the uses of such cameras as are provided with such improvements and advantages as the sliding fronts, the swing back, and folding-bed. The use of the sliding front is to enable the operator, by moving it up and down, to get a greater or less amount of foreground or sky as he may wish, without tipping the camera, which will cause the lines on the outer edge of the plate to converge at the top or bottom. The swing back permits very near and distant objects to be brought to a sharper focus by increasing or diminishing the distance between one edge of the plate and the lens. The convergence of the lines, as above described, can also be corrected by the use of the swing back, by swinging the frame to which the plate-holder is attached. This frame, or, more properly speaking, the sensitive plate, should stand in a vertical position.

“The folding-bed is added to make the camera more compact for transportation.”

## USE OF EXTENSIONS.

Extensions are a contrivance for placing the plate a sufficient distance from the back of camera proper to allow the rays to spread to the size of plate to be used on the extension; it will, therefore, be understood that an extremely long or an extremely short focus lens cannot be used successfully.

In completing this adjunct to photographic apparatus it was not the idea of the inventor to substitute (for example) a  $5 \times 8$  camera proper with an  $8 \times 10$  extension, for an  $8 \times 10$  camera, when the operator intended using  $8 \times 10$  plates in the majority of cases, because it would be more desirable to have an  $8 \times 10$  camera proper; but the idea was to furnish an attachment for the use of the operator who used  $5 \times 8$  plates as a rule, and occasionally desired to use an  $8 \times 10$ , etc. The only disadvantages in a camera formed with the extension attached is, that a *very short focus* lens cannot be used on account of the distance between the ground glass and camera front, and the fact when using a *very long focus* lens, the frame of camera proper prevents the rays from the lens spreading to the edge of the plate. To correct the former a recess front can be used. The latter can only be remedied by increasing the depth of the extension.

We will now require to transfer the sensitive plates into the plate-holders, and, in order to enable us to do so, we will require a dark room.

## THE LIGHT.

The light by which the plates can be changed or developed with safety is of a dark ruby, and all other should be entirely shut off, which forms what is known as a "dark room;" but this does not mean a room with the door closed, and light coming in through cracks and openings. For convenience and safety I would advise the novice to defer removing plates from the light tight box until after dark, when by the aid of a suitable light the operation can be carried on without the trouble of darkening windows, etc., unless a very strong light is outside, in which case closing blinds or drawing shades will be found safe. Electric light must be guarded against with great care.

To test the actinic power of your light, take an unexposed plate and cover one-half with some opaque substance, and place the uncovered part before the source of light, so as to get the benefit of its strongest rays for one or two minutes, and then develop the whole plate. If the actinic rays have not been fully filtered out, the exposed part will darken while the other will remain unchanged.

Having become satisfied on the safety of the light in the room, proceed to open the package of plate, and place them in the Plate-holders. (See Article on the Gelatine Bromide Plate, page 14.)

As the easiest and proper method of filling and emptying a Plate-holder may not be at once apparent, the following instructions are given:—

"To fill the Blair Patent Double Dry Plate Holder remove the slides and the locking block which occupies the space between, and pull out the movable bars separately (or together, as desired), until the outer edge of the bar rests against the inner portion of the Stop. By this means the opening in the holder is enlarged an eighth of an inch. Next place one end of the plate, *film side outward*, underneath the projection in the opposite end of the holder, when by pressing the plate against the spring on the division-board until the outside of the plate is below the inside of the projection of the movable bar, the latter can be pushed down into its former position, which will hold the plate securely in position by the projection of the holder overlapping the respective ends of the plate, and the metallic spring pressing the same forward. To fill the other side the operation is, of course, repeated. The locking block and slides are then replaced, and the holder is secured against an accidental shake opening it. In pressing the plate down while filling the holder the hands should not touch the film, the back of the finger-nail or a dry handkerchief answering the purpose best. Smaller plates are used by sliding it into the corresponding size of nest, and the latter, with the plate in it, is placed into this holder as though a full-sized plate."

## THE FEATHER-WEIGHT PLATE-HOLDER.

(WITHOUT BACK SPRINGS.)

This Holder being very compact, and the thickness of glass varying so exceedingly, the springs usually employed on the dividing-board to keep the plate pressed tightly to the front is not supplied; only sufficient space having been allowed to accommodate the thickest plate likely to be used. In using thinner ones, a slight bedding of soft paper may be placed in the holder, and in pressing the plate down it will be found that the paper, acting in combination with the pliable division-board, forms a very admirable spring or cushion.



To fill, draw the slide of the Holder and place on end (the end from which the slide is drawn being upward), put one end of the plate in the downward end of the Holder, UNDER the projecting corner; next, if deemed desirable, place the tuft of paper bedding to hold the plate out (as before described), press the plate down until it rests against the ledge, and turn back the narrow cloth flap; replace the slide, and all is ready.

After putting into the holders as many plates as are likely to be needed for a day's work, pack the outfit so that it can be conveniently carried about.

To remove the plate, draw the slide, turn up the cloth flap, and while the Holder is on end, inclined face downward, give it a slight thump on the knee (or something not liable to bruise the holder), and the plate will fall into the hand. This is accomplished by the plate springing downward below the cloth flap.

Feather-weight Holders, which are supplied with back springs, have beneath the cloth flap a projection under which the plate rests after being pressed down as described. Holders with springs are necessarily thicker than those without springs.

With the foregoing directions, holders of other styles can, I think, be readily understood.

The Holder known as the "English" opens after the form of a book, the plate being placed in, and the holder closed and fastened.

## DIAPHRAGMS, OR STOPS.

The revolving disc, or strips of brass, having different-sized openings, and placed before the lens, in single lenses, and between the lens in combination lenses, in the mount, are called diaphragms, or stops, and are often the cause of much perplexity to the amateur. His first supposition (and a very natural one, too) is that the smaller opening is for smaller pictures and the larger one for larger pictures, when the rule is to the contrary, as I will endeavor to explain.

By taking a lens and placing it in an open tube, corresponding with its size, an image, flooded with light, will be found on the ground glass, but almost entirely without sharpness or definition, more especially at the edges and corners of the plate, the latter caused by the curvature of the glass in the lens. It will also be found that distant and near objects cannot be brought to any degree of sharpness at the same distance of the ground glass from the lens. By placing a diaphragm, or stop, before it, the equality of sharpness in distant and near objects is increased, as is also the definition in the edges and corners; and it will be further seen that the smaller the stop the greater this increase in definition. This is, however (as might be expected), at the expense of the light on the plate, and necessitates longer exposure. For landscapes and general work the medium stop should be used; when the light is very intense, and very fine definition is desired, the smallest can be used. The largest is desirable when there is but little illumination, or short exposure is required on account of moving objects, or for instantaneous work.

## PREPARING TO TAKE THE PICTURE.

For field-service a camera, a number of plate-holders filled with sensitive plates, a lens, tripod, carrying-case, and focussing cloth are needed. When these have been taken to a place where the view looks inviting, fasten the

camera on the tripod, throw the focussing-cloth over your head, gather it under your chin, draw out the camera, thus extending the bellows, and continue the movement until the image on the ground glass appears most distinct; then fasten the back of the camera. This is called "focussing." At the first glance an inexperienced person sees no reflection on the ground glass, but the eye soon becomes practised to perceiving the inverted image there.

When the image has been satisfactorily focussed tighten the clamping-screw, *cap the lens*; remove the ground-glass frame, and in its place adjust a plate-holder, draw the inner slide, and expose the plate by uncapping the lens. The nearer the camera is brought to the object to be photographed the farther the camera bellows will need to be extended to obtain a sharp image; thus it is difficult to get two objects, one of which is very near, and the other far distant, in focus on the same plane.

Careful and accurate focussing will repay you, as clear definition cannot be obtained without it.

In instantaneous work the focus must be obtained upon the spot where the object is expected to pass, with a large diaphragm, or the full aperture of the lens, before the time comes for taking the picture. Then, by looking along the sides of the camera, or a pair of sights on top of it, or by a finder, you will see when the object has reached the middle of the view, and will release the instantaneous shutter.

When operating in strong sunlight, all cameras of whatever style or manufacture should be protected by having the focussing-cloth thrown over them, most especially when the plate-holder is attached and the slide has been drawn. By taking this simple precaution you may save a valuable plate, which might otherwise be ruined.

When you wish to make another exposure the holder is to be turned over, and the plate in the opposite side exposed in a like manner. It is very important to keep a memorandum of time of exposure, subject, number of plate-holder, etc.; and, if more than one plate-holder is used, they should be numbered in some legible and permanent manner, the first holder one and two, the second three and four, and so on. It is exceedingly annoying, while developing your plates, to find two of your most valued subjects consolidated into one, from having exposed the same plate twice. The registering slides, which are part of the plate-holder, form an admirable and convenient means of avoiding all such occurrences.

## COLORS PHOTOGRAPHIC.

If there is any one characteristic in photography which prevents it from being a truthful portrayer of nature more than another it is the different effect which colors have on the chemicals. For instance, yellow, orange, red, and those of a like tint are the most non-actinic; blue, and its associate color, the least. Now, in representing colors in a drawing, we would naturally indicate yellow, orange, etc., as much lighter than blue; but, in photography, yellow will be represented as almost, if not wholly, black, while blue, etc., the direct opposite; therefore, in making the exposure in the camera, it is well to note the prevailing colors, and govern yourself accordingly.

## EXPOSURE.

In this depends largely the success of your undertaking, and here your judgment must be used to a large extent. As no two landscapes are exactly

alike, and the same landscape on two successive days may perhaps require different exposures, it is impossible to make positive rules.

Near views, groups, and machinery require much longer, often triple, exposure, when placed under the same volume of light as that of the landscape just mentioned, and, of course, when the light is less, as in a building, it must be lengthened accordingly. For *interiors* there is but little danger of over-exposure. Where you would require one second for a landscape, a moderately well-lighted interior would require from two to three minutes, owing to the difference of light.

Always bear in mind the fact, that if we give  $27\frac{1}{2}$  minutes when 25 would have sufficed, we have overtimed only in proportion to giving 11 seconds when 10 was the number required. When photographing in deep, dark ravines lengthen the exposure according to your judgment, especially when the prevailing colors are of a non-actinic nature.

The "exposure" is made by uncovering the lens to admit the views to be transferred to the sensitive plate; by whatever means that is done, the camera should be jarred as little as possible. This is as far as I am able to assist you, and the rest must be gained by experiments. In making these, if you are doubtful about the proper time required, expose two or three different plates, varying the time one-half. In fact, this is advisable for the beginner.

The exposures having been completed, the plate can be kept for a convenient time and place, for development.

## THE GELATINE BROMIDE PLATE

Is a film of gelatine made sensitive to the action of light by bromides and nitrate of silver, supported by glass, which is used because of its firmness and allowing the light to pass through unobstructed. The side of the glass on which the film is can be discerned by being of a mat appearance: if, however, there is doubt as to which is the film side, apply a knife to one corner, and the film will scratch off.

When exposed to the image in the camera, the lighter parts are acted upon most rapidly, the half-tone less, and the extreme shade but little, and sometimes not at all. Upon the application of the developer, where the light has acted, a deposit is formed over the entire surface, the greater the action of the light the greater the deposit; therefore, when fixed, we have a semi-transparent picture, the opaque parts representing the high lights, the more transparent, the half-tones and shadows. Supposing we had developed this plate without exposure in the camera, no image would have appeared, the plate remaining unchanged. Upon fixing, we have apparently a plain glass as a result. Again, supposing we had exposed the plate to actinic light, the entire surface is acted upon, and when the developer is applied, a deposit is formed over it, causing the plate to turn a dark brown, and, when fixed, remain opaque.

In the use of "negative papers" or "films" the process is the same, excepting that the support for the image is of other substance than glass, to economize in weight and liability of breakage.

Owing to the successful manipulation of this film being more difficult than with glass plates, I would advise the beginner to commence his operations with the latter, even if the additional weight does enforce some little inconvenience.



## DEVELOPING.

### THE DARK-ROOM, OR PLACE OF OPERATION.

(See remarks on *Light*, page 11.)

The surroundings of the operator will govern largely where this will be, or how constructed. When at home, the bath-room, kitchen-sink, or like convenient place is most desirable. When in the woods, if not too strong, moon-light, and, in suitable weather, sitting beside a brook, is to be recommended; in fact, it is really one of the most convenient as well as poetic situations. The principal points to be considered are plenty of cool water, protection from actinic light, and a suitable surface on which to set your utensils, with nothing damagable underneath, and perfect order and cleanliness. It is useless to add that a room, with appliances arranged especially for this purpose, which can be used night or day, is much the more desirable, especially so to business firms or corporations who desire to make negatives at all times, and to see at once the results. To those who can equip themselves with such facilities we append the following suggestions:—

“Where possible it is best to have a good-sized closet, or room, with walls and ceiling plastered and painted or tinted a dark color. Entrance should be had by double doors, forming a vestibule between, so that upon opening the outer door you step into a vestibule; closing the first door after you, open the inner door, which admits you direct to the dark-room. With this arrangement you can enter or leave the dark-room when development or any manipulation is being carried on, without admitting any outside light.

“A closet can be made of thin, matched sheathing, in most any place; and, after being painted dark on inside, as a double safeguard, it should be papered with black or ruby paper, light often entering where the sheathing shrinks. The paper should not be pasted or glued on, merely tacked in a smooth manner.

“The dark-room should be ventilated in some manner without admitting any light.

“The best light for a dark-room is taken through a window from out-of-doors. The casing of window should be made light-tight, and frame covered either with a ruby or yellow post-office paper, in several thicknesses; or, have one or two thicknesses permanent and several frames covered with the paper, which can be inserted in the casing, enabling the operator to have, at will, a weak or strong light.

“When daylight is not possible a large lantern, arranged to take two or three lights of ruby or orange glass, can be used, both to illuminate the room and for development.

“A good supply of pure water is an absolute necessity, and, where unobtainable from city service, a large tank or barrel can be placed above the sink, using a pipe or tube with stop-cock. A wooden sink, painted inside, when kept clean, is preferable to any other. Have plenty of shelf-room, conveniently arranged, a place for everything, so that you can find anything at once, even in the dark.”

## CHEMICAL SOLUTION.

When a reliable developer can be obtained ready for use, it is generally more satisfactory to procure the article than the chemicals, and have the trouble of mixing.

I give, however, a complete formula, so that the operator may make his choice.

(Instructions for using the commercial article are usually supplied with it.)

Make solutions as follows:—

Pyrogallie Acid . . . . .	1½ oz.
Sulphite of Sodium Crystals . . . . .	6 oz.
Sulphuric Acid, C.P. . . . .	20 to 30 drops.
Water . . . . .	80 oz.

Label it, Stock Solution No. 1.

Carbonate of Sodium . . . . .	6 oz.
Water . . . . .	80 oz.
Bromide of Potassium . . . . .	15 grains.

Label this, Stock Solution No. 2.

Filter both solutions and keep in corked bottles. *When ready for use* mix equal parts No. 1 and No. 2, using, for a 5 × 8 plate, about four ounces of the mixed solution. Larger and smaller size pro ratio, enough to cover the plate fully is always required.

“Keep all solutions as cool as possible, and well corked.”

A larger portion of pyrogallie acid in the developer increases the density of the negative, a lesser portion decreases the density. The effect of bromide of potassium is to give clear shadows, thus rendering greater contrasts; therefore, to increase or decrease this effect, use a lesser or greater quantity of the salt (bromide of potassium).

*Alum* in the fixing-bath hardens the film and prevents frilling and blistering. A lesser quantity than given in formula will be required in cold weather.

## ARRANGEMENT.

After having obtained a suitable place make the following preparation: Select one of the trays, and after washing it thoroughly, set it on a level surface to your *left*; next, place the other tray to your *right*, and put therein the fixing solution, made up at the rate of, water, 6 oz.; hyposulphite soda, 2 oz.; pulverized alum, a few grains. This quantity will be found sufficient to cover a 5 × 8 plate. Place before you a sufficient quantity of the developer, mixed, and have your ruby light in a convenient place to watch your work; also have near at hand a vial of 30-grain solution of bromide of potassium (30 grains potassium to 10 oz. water), plenty of cold water (iced if possible in summer), and a convenient place to wash the plates.

Then we are ready for excluding all actinic light, and proceed to the



## DEVELOPMENT OF THE IMAGE.

Lay the exposed plate, *film side* up, in the tray at your left, and taking the graduate containing the "developer" in your right hand, tilt the tray slightly to your right, and pour in an even wave the entire amount of the liquid, at the same time bringing the tray back to its horizontal position, or slightly inclined to the left. Now see that the tray is on a level surface, and let it remain, being sure that the surface of the plate is entirely covered with the liquid. The image should now appear in a few minutes (say two or three), the high lights growing dark (of a brownish color), and the shadows remaining of the original color of the plate. If correctly exposed, it will gradually grow in strength, the detail in the shadows becoming distinct. Allow the development to continue until the image commences to fade away, or the shadows change to a brown color, and the entire picture apparently lost. This gives sufficient printing density to the negative. If the development is checked too soon, the negative will be weak and thin. If the plate has been under-exposed, the image will be a long time making its appearance, and after a prolonged development the shadows will still remain clear and the color of the film unchanged, and when fixed the whole plate will be transparent, giving a flat, dull picture, which will print very quickly. On the other hand, should the plate be over-exposed, the image will flash out more quickly, and almost immediately commence to fade away to the brown color above mentioned. Should it be "fogged" by light, the image will not appear at all; or, if at all, faintly, and will rapidly turn dark. In error No. 1 the remedy is to pour the developer back into graduate, and add more pyro., mixing well, and flow over the plate again, allowing it to remain in the developer as long as it continues to have any effect. (Remember that pyro. gives the *strength*, and soda the *detail*; so the more time given, the less soda needed.) If, when fixed, it is then too thin, the best course to pursue is to make another trial: give from  $\frac{1}{4}$  to  $\frac{1}{2}$  longer exposure; if very thin, double the time, but should another exposure be impossible, proceed according to directions in Intensification. In error No. 2, after the image has flashed out, pour the developer back into the graduate, and slightly rinse the plate with water, and add one or two drops of the solution of bromide of potassium for every ounce of developer, or dilute the developer with water. Now, again pour on the developer, as before, and proceed, but only until the image is in the condition given in development proper. In error No. 3, or the latter case, there is no remedy.

After development the plate is thoroughly washed and placed for a few minutes in a saturated solution of alum, rinsed, and placed in the fixing-bath, where it should be allowed to remain until all the bromide in the film is dissolved, *i.e.*, all the whitish tinge to be seen when looking at the back of the negative is removed (to be sure that it is entirely removed allow it to remain a minute or two longer); it is then thoroughly washed and immersed in a saturated solution of alum for five minutes, rinsed, placed upon the drying-rack, and set away in a warm (not hot) place, free from dust, and allowed to dry, which will probably take one or two hours. The time required for a properly exposed plate to develop will range from five to ten minutes, sometimes fifteen or even twenty will do no harm. Prolonged development causes density; shortened development, thinness. After sufficient detail and strength in the shadows is gained, further development is injurious, but until then it is beneficial. Over-development is better than under-development.

## AFTER FIXING,

should the negative appear too intense, or of a yellow color, pour over it the following clear solution :—

Alum, 1 oz., Citric Acid, 1 oz., Water, 20 oz.

Take of this solution six parts, and add saturated Solution of Iron, one part. To keep the iron solution, add to each two ounces one drop of Sulphuric Acid.

This treatment gives the plate the appearance and printing quality of a good wet plate, and if prolonged will reduce the intensity.

## WASHING.

The negative should be thoroughly freed from the Hyposulphite of Soda by washing for an hour or more in frequent changes of water, or under the tap for from fifteen to twenty minutes.

## INTENSIFICATION.

When a negative is fully developed in detail, but lacks in strength and contrast, intensification is required; but this process is one in which even the expert often ruins his most valuable negative. It is well, therefore, to proceed with great care. To effect this, after the negative has been thoroughly washed and dried prepare the following stock solution :—

Bichloride of Mercury, saturated solution.		
Iodide of Potassium,	"	"
Hyposulphite of Soda,	"	"

Pour the mercury into the iodide until it remains red after thoroughly shaking, then add slowly sufficient of the Hyposulphite of Soda to clear the color, being careful not to add too much; if so, it will not intensify. In that case a fresh mixture must be prepared of the iodide and mercury, and enough added only to clear it.

Before using, dilute about one-third with water.

Immerse the plate in the intensifier in the same manner as when developing, being sure that the tray is *perfectly clean*. The plate should be removed from the intensifier as soon as it has attained the proper printing density, and *thoroughly washed or soaked* before drying.

## VARNISHING.

After the plate has become dry it is the custom of most photographers to protect the film by coating it with varnish. Where many prints are desired this precaution is advisable, but for proofs or a limited number of prints, with the exercise of a reasonable amount of caution, it is better dispensed with. In fact, in my professional work I have not varnished a dozen negatives, and from many unvarnished negatives have made thousands of beautiful clean prints; but there always remains the danger of the paper becoming moist and sticking to

the gelatine film, thus practically ruining what may happen to be your most valuable negative. To apply the varnish, warm the plate about the temperature of the body, and flow, by holding it by the lower left-hand corner firmly between the left forefinger and thumb in a horizontal position; allow the solution to flow first to the upper left-hand corner, next to the upper right, from there to the lower left, from thence back into the bottle from the lower right; drain perfectly; again warm, and set away to cool.

## PRINTING.

We now come to the final process, which is to be the result of all our care, taste, and expenditure of time, and which is to increase or diminish our photographic pride. All previous manipulations are but as the preparation of the canvas and paint for the use of the artist in idealizing his thoughts into a picture. To become an adept in this branch, taste and experience are requisites, and a surety of excellence cannot be gained without them. With good negatives, material, and light, the printing of the picture is undoubtedly the most pleasant part of the amateur's work; but it is a discouraging fact that they are attended with the least success, caused largely by lack of facility, apparatus, and a constant working of the chemicals, which keep them in their rich, harmonious condition.

Where a large number of prints are wanted, and the result, not the practice, is desired, it is without doubt cheaper and more satisfactory for the amateur to pass his negative to an establishment that makes a specialty of this class of work; but to the true artist-amateur the novelty of *truthfully* making the *picture*, which he presents to his friend for keeping or criticism, is the source of the greatest satisfaction, and to do this in the simplest, easiest, and yet most perfect manner, I shall endeavor to assist him.

Like the preparation of the gelatine plates, the sensitizing of the paper had better be left in the hands of the professional, or those who prepare it for the photographic trade, as the limited amount which the amateur is likely to use makes it economy for him to buy the paper ready for use, saying nothing about the freedom from stains which favors this course.

If the paper has been procured from the professional photographer, it should be ascertained whether or not it has been "fumed."

Commercial, or what is known as "Ready Sensitized Paper," is not, as a rule, fumed when sold.

Fuming the sensitive-paper with ammonia before printing, increases the brilliancy of the print, as well as the sensitive qualities of the paper, rendering the toning easier. As it destroys the keeping qualities of the paper, fume only for immediate use.

TO FUME on a small scale, proceed as follow: Over the bottom of a small box (a plate box will do) spread a small quantity of absorbent cotton. On the cotton sprinkle a few drops of strong ammonia water; cut a piece of blotting-paper to fit in the box and lay over the cotton; on the blotting-paper lay the sensitive-paper, and close the box.

The sensitive-paper should not come in direct contact with the liquid ammonia, and if the cotton should be wet enough to cause the moisture to penetrate the blotting-paper, another sheet should be added.

Where it is desirable to fume in large quantities, procure a box or drawer of suitable size, and place supports across, near the top; fasten two sheets of sensitized paper together by the extreme edges, and place across the sticks



with faces outward; several sheets may also be fastened by the corners to the inner surfaces of the box with faces outward; place a saucer containing some stronger ammonia in the bottom of the box, and close the cover.

From fifteen minutes to a half-hour is the time required to properly fume sensitized paper; remove the paper from the fuming-box at least five minutes before placing in the printing-frame. This done, cut the sensitive-paper, in a darkened corner of your room, into pieces the size of print you wish from the negative. If a printing-board is to be employed, lay the sensitive side of the paper on the film side of the negative, firmly hold them together with the right hand on the upper part of the negative and paper; then take the board in the left hand by the narrow hinged part; this will allow the upper or wide part to fall over; by this you are enabled to lay the negative on the padded lower part, and by relaxing the under fingers of the left hand, and then including in its grasp the printing-board also, the right hand is free to apply the spring clamps on both parts to get the pressure. These clamps should be applied only on the extreme corner, so as to avoid leaving a white mark on the print.

If instead of a board, a printing-frame is to be used, remove the spring and pressure board, lay the negative in the frame, *film side up*, and place the sensitive sheet of paper, sensitive side down, as above described, replace the board and apply the springs. This presses the paper in contact with the negative, which *must be*, to insure a *sharp* print. Now lay in the sun, allowing the rays to strike as evenly as possible on the negative: after a few moments examine the progress of the operation by unclamping one side of the board and turning back the paper, which will be found to have darkened in parts, and thus transforming the clean, white paper into a picture. The length of time which is required to print a picture is governed by the density of the negative and the strength of light. As you can watch the progress with ease, it is your only means of knowing when it has undergone sufficient change, and even by this method the amateur will find some difficulty in deciding in which stage rests the "happy medium." The toning process is one which bleaches; therefore, the print requires to be many shades darker than is desired in the finished picture.

This is simply an outline of the mechanical method of producing a print, and the student must not feel that in once successfully completing this task he has exhausted the subject; it is one on which volumes have and still can be written, but into the depths of which this guide to the "dusky art" cannot enter. It is my object to successfully teach the novice to make a photographic picture; after having accomplished this he is then ready, if he so choose, for deeper investigation into each succeeding step towards the completion of photographs in which can be seen evidence of forethought, study, and careful treatment of light, subject, negative, and print. To produce a warm, brilliant print, a negative rich in detail and contrasts must first be obtained. To make such a print from a weak, thin negative is a difficult and often impossible task for even the expert, but the printing qualities of all such negatives can be greatly enriched by resorting to many artifices, such as the following, which are well known to any first-class photographic printer:—

When, by intensification and other means, you have failed to get sufficient contrast in your negative, and your prints show a lack of clearness in the whites, and have a general "measly" appearance, cover the negative with two or three thicknesses of tissue-paper (white) or ground glass; this evidently protects the whites, and allows a greater proportion of light to pass through the shadows; but be this as it may, it is a well-known fact that if

two prints be taken from a weak negative the one printed by diffused light will be found the most brilliant. Parts of the picture which are too dark can be greatly improved by shading with some opaque substance, keeping the shade moving so as to allow no outline to be printed; in this way skies can be lightened, and other parts of the picture shaded, while very intense portions are printed deeper. For a treatise on this class of work I cannot do better than refer the amateur or professional to the most excellent work of H. P. Robinson and Capt. Abney, entitled, "The Art and Practice of Silver Printing."

## CUT-OUTS, OR MASKS, FOR PRINTING.

In a piece of opaque paper cut any size or shape opening desired, and adjust it on the face of the negative until in a position to suit the taste of the operator; then trim the edges of the paper to size of the negative, while it has been kept in this position.

When wanted for use the mask is placed between the negative and the sensitive-paper, and this prevents that portion, usually the border coming under the mask, from being changed in color while the exposed part is printed. Cut-outs, or masks, in all forms, can be bought of dealers.

Vignetting the picture is done by causing the printing of the negative to blend into the protected and unprinted margin, instead of in a sharp line, as is the case with masks. For this purpose, there are many devices to be obtained, at a small cost, of dealers, each of which are so simple to use that any description is unnecessary except to add that the vignetting mask is placed in front of the negative, instead of between the negative and sensitive paper, and from a quarter of an inch to an inch from the face of the negative, owing to the construction of the device and the effect desired. The farther the mask is from the negative, the softer will be the blending from the printing in the centre to the white border. Light must be prevented from coming in on the negative from the outside of the mask.

An ounce of thought; a spoonful of experience, seasoned with good taste; manipulation by a person with ordinary intelligence, — should quickly produce pleasing results.

The printing having been completed, remove the backboard and print, and proceed to trim the latter by using the trimming-glass and a sharp pair of shears, or the print-trimmer. It should not be the aim of the artist to get as large a print on his mount as possible, for a 5×8 print which has in one portion of it a *picture* measuring 4×5 inches, with the remaining portions uninteresting or poor, would be far more pleasing with the objectionable part removed. Great taste can be exercised in this evidently simple branch. A desired number of prints having been made, we now proceed to the washing, toning, and fixing, or, in other words, to render permanent the temporary pictures which we now have, and which would continue to print or grow dark in all parts exposed to light. The first step is to wash out the fine salts of free silver by placing the prints one by one in a dish containing water, being careful that they do not stick together until thoroughly wet; put them into fresh changes of water several times, or until the milky sediment which usually forms has been largely washed out of the print.

A reliable commercial toning solution is undoubtedly the more desirable

article to use, but not desiring to confine the operator to such, I give instructions to prepare a solution, commonly called a toning bath, as follows:—

#### SOLUTION 1.

Water	.	.	.	.	.	.	.	20 oz.
Common Salt	.	.	.	.	.	.	.	60 grains.

#### SOLUTION 2.

Chloride of Gold	.	.	.	.	.	.	.	15 grains.
Water	.	.	.	.	.	.	.	10 oz.

#### SOLUTION 3.

Bicarbonate of Soda	.	.	.	.	.	.	.	2 oz.
Water	.	.	.	.	.	.	.	4 oz.

#### TO COMPLETE THE TONING BATH.

Into toning-tray place the entire amount of Solution No. 1, and take of Solution 2,  $\frac{1}{2}$  an ounce, Solution 3, 15 drops, or sufficient to cause red litmus paper, or test-paper, to turn purple; this denotes that the bath is in an alkali state, which *must be* before it will act on the prints. If the bath has been freshly made it should stand at least fifteen minutes or half-an-hour, and after toning kept for future use, when all that will be required is a fresh supply of gold, and the bath again made alkaline. In order to preserve the keeping qualities of the gold it *must* remain in an acid condition, as when alkaline the gold precipitates, and in this state of precipitation the prints only can be toned: thus we are compelled to supply a fresh quantity at each toning; but the solution of itself apparently grows richer with use, and imparts a deeper and more brilliant color to the prints.

The prints, now having had the free nitrate of silver removed from them by washing, and the toning bath is awaiting the time desirable before using, we will proceed to acidify the *former* (the prints) by soaking them for a few minutes in the following solution:—

Water	.	.	.	.	.	.	.	20 oz.
Acetic Acid	.	.	.	.	.	.	.	$\frac{1}{2}$ oz.

But this, however, is not an *absolute* necessity, as many photographers tone the prints directly from the washing, but it has always been my constant custom to acidify them. Before the prints are put in this solution (if from good negatives and on good paper) they should be of a rich purple color. They will now soon commence turning to a reddish brown; allow this color to ripen until quite deep; then remove and wash in two or three waters, or until no trace of the acid is left in the water: when acid is present the water will taste sour. The toning bath now being ready for use, the prints are placed one by one therein.

Changing the prints from an alkaline to an acid state (or from a blue to a red color) by the above process, is done to enable the operator to watch more easily the Process of Toning, which again changes the print back to something like its original color before acidification, and leaving the high lights clear and pure. The proper stage at which to stop the toning is very difficult to describe, as prints from different negatives appear of a different color, and dif-



ferent brands of paper tone very differently, some requiring more toning than others; again, what one might call a rich *warm* tone another will often think undertoned or too red. As a general rule remove the print and place it in fresh water when it has changed to a dark blue. The rest I must leave to your judgment and taste.

## FIXING.

This is the final chemical process through which our picture has to pass, and, as the name implies, it is for the purpose of fixing the color or making the print permanent (so to speak). Yes, it is a "fixer," for many an enthusiastic amateur has found his fondly cherished work sadly "*fixed*," in the most literal sense of the slang term. Hyposulphite of Soda (which forms the fixing solution) is the friend of photography: after all other chemicals have given their assistance to form and build the image, "*Hypo*," puts forth his staying hand and arrests the escape of the "fading reality;" but after he has finished his work the wise photographer will drive him energetically away; yea, let no trace or vestige be left, or your feeling of love for him will be turned to hatred.

*The Fixer* is composed of—

Hyposulphite of Soda	.	.	.	.	.	1 oz.
Water	.	.	.	.	.	10 oz.

After the crystals have become thoroughly dissolved place the toned prints in the solution, and keep them in motion for fifteen or twenty minutes, then remove to the final washing-water. Had the prints been placed in this solution before being toned they would have turned a yellow, muddy color; therefore, if the print is undertoned it will turn and remain in this state, and if overtoned it will be blue or cold gray after having been immersed a few minutes. Under either circumstance they will generally assume a brownish or reddish color when first immersed.

After fixing, the prints should be thoroughly washed in running water for at least two hours, or if in haste, held simply under the tap for fifteen or twenty minutes. They are then ready to be mounted or otherwise disposed of.

## A NEGLECTED METHOD OF SILVER PRINTING.

BY CHARLES L. MITCHELL, M.D.

[Read before the Photographic Society of Philadelphia.]

During the past five or six years, and with the advent into popular use of the dry-plate process of photography, considerable attention has been given to different methods for producing, by photographic processes, various artistic effects in printing the picture, in simulation of those obtained by the mechanical processes of the engraver and etcher. The albumen silver print reflects the general popular taste, and when artistically made is always pleasing, but the gloss and brilliancy of its surface soon become monotonous and even

wearying, and the eyes seek relief in the mellow tones and soft outlines of a well executed etching or engraving. This has led to the introduction of the various forms of bromide paper, "Alpha" paper, platinum prints, etc., etc., all of which seek to reproduce on a dead or mat surface paper, by different chemical methods, the blacks, purples, grays, and various half tones, obtained by the skilful use of the engraver's tool, and to give effects corresponding to those found in a fine line engraving.

The use of these papers has led to considerable change in the styles of photographic printing, and although the albumen print will probably always be to a very large majority of persons "the photograph," and the only form recognized by that title, there will remain a considerable minority, to whom the other more novel and more artistic styles of photographic printing will prove most interesting and enjoyable. The use of bromide paper for preparing prints, and particularly for enlargements, is rapidly increasing, and yet the writer feels compelled to acknowledge that, after considerable experience in its use, he has frequently been disappointed in the results obtained from it. For enlargements, which can afterwards be worked up with the stump and crayon, it leaves nothing to be desired, but for contact prints and enlargements of moderate size, which are to receive no further finishing, it must be confessed that there is often in the finished bromide print a lack of the finer details of the picture, which is rather disappointing when compared with a good albumen print prepared from the same negative. Furthermore, the process is, to a certain extent, one which must be carried on in the dark — in a double sense — for not until the paper is exposed, and the latent image has commenced to show itself under the influence of the developing solution, does the operator know whether his exposure has been properly timed so as to secure the best print, and it is then too late to more than partially remedy the difficulty by influencing or modifying the remainder of the already partially completed development. It is true a succession of trials will soon determine the proper exposure for any one negative, but this takes time and is expensive, so that among photographers, and particularly amateurs, to which class the writer now mainly addresses himself, the remark is often heard, "Yes, bromide prints are very beautiful when you can get them just right, but I find much difficulty in doing so, and but few negatives produce fine results. For general work I prefer a good albumen print."

The purpose of the writer is to call attention to a style of silver printing, once quite popular but now fallen into comparative disuse, which is, while probably no better in its finished result than the bromide process at its best, yet considerably more certain in its result, at least, as easy in its execution, and affords a variety in effect much superior to that produced by the bromide process. I allude to the old method of printing on plain paper, sensitized with chloride of silver. Years ago, in the time of the old wet-plate processes, this method of printing was quite popular, but of later years it seems to have dropped almost completely out of sight, and there is but brief mention of it made in the different technical works on photographic printing. Yet it gives results which are so extremely beautiful, that it seems but proper that more attention should be directed to it, and particularly by those artistic photographers who are always seeking new and beautiful photographic effects. In portrait work it gives beautiful soft outlines and warm tones, and for landscapes, architectural studies, genre pictures, copies of old engravings, etc., it gives results which for softness, delicacy, and perfection of tint cannot be surpassed by any other method with which the writer is acquainted. With it a great variety of tones can be obtained, ranging from a sepia or a rich brown



to a deep purple or even black, capable of reproducing in many instances the same soft and warm tints of an old mezzotint or copper-plate engraving. Furthermore, as the process is conducted in the same manner as in ordinary albumen printing, the period of exposure is not an uncertain quantity, but the printing can be watched as it goes on under the printing-frame, and the depth of the print and consequently the character of the subsequent tone, regulated according to the taste of the operator.

The details of the process are briefly as follows: The paper used should be an ordinary plain white paper — Rives, for instance — with a moderately smooth surface. This is to be salted in the usual manner with a soluble alkaline chloride (sodium or ammonium), a small quantity of gelatine or albumen being added to the bath, so as to give a slight size to the paper, and the paper subsequently well dried. Such paper can generally be procured from the dealers, already prepared. Other varieties of white paper with a rougher surface, corresponding in grain to the “C” Bromide paper, may be prepared in a similar manner, and the writer hopes to be able to make further experiments in this direction.

This prepared and salted paper is now to be sensitized. This is done by floating it on a sensitizing bath composed of fifty grains each of silver nitrate and ammonium nitrate to the fluid ounce of water. The bath should be kept slightly alkaline by the presence of a small quantity of silver carbonate (produced by adding a few drops of a solution of sodium carbonate to the bath), the clear supernatant liquid being always poured or filtered off from the precipitated silver carbonate before the bath is used. The paper should be allowed to float on this bath for from three to five minutes, — three in summer, five in winter, — and then hung up to drain and dry. All these operations must, of course, be performed in a darkened room, the same as in silvering albumen paper. When thoroughly dry, the sensitized paper must be fumed with ammonia for fifteen minutes, in the fuming-box, and is then ready to print. This is done by exposing it, under the negative, to the sun, in the usual printing-frame. The paper prints rapidly, and from time to time the frame must be removed to a dark place and the progress of the printing inspected. Here is one of the great advantages of this process over the Bromide process, for the operator can see just what he is doing, and can at any time stop the printing when the color of the print shows it to have gone far enough. The prints when removed from the printing-frame are to be soaked in a bath composed of acetic acid one ounce, water one pint, for about fifteen minutes, and then this poured off and the prints washed with half-a-dozen different changes of water, until nearly all the free silver has been removed. They are now ready for toning. The toning bath used is that formulated by Dr. E. L. Wilson, and is composed as follows:—

Acetate Sodium	. . . . .	60 grains.
Chloride Sodium	. . . . .	60 “
Chloride Gold	. . . . .	4 “
Nitrate Uranium	. . . . .	4 “
Water	. . . . .	32 fluid oz.

“Neutralize the gold and uranium, previously dissolved in a little water, with sufficient bicarbonate soda. Before using, add gold, to renew the bath, as necessary.”

The prints are to be introduced into this bath, one or two at a time, and allowed to remain there until the proper tone is reached, the dish being kept

gently in motion during the operation, so as to avoid uneven toning. This portion of the operation requires careful watching, as, owing to the porous and absorbent character of the paper the prints tone much more quickly than the glossy albumen prints. A few minutes is amply sufficient, and for the lighter tones of sepia and brown, it is enough to but dip them in the toning bath for only a few seconds. A little experience will soon indicate the proper length of time. After removal from this bath they are to be rinsed with several waters and then transferred to the fixing bath. This is best made as follows:—

Hypo-sulphite Sodium . . . . .	2 oz.
Salt . . . . .	1 oz.
Bicarbonate Soda . . . . .	$\frac{1}{4}$ oz.
Water . . . . .	1 pint.

Any of the ordinary Hypo. baths used for fixing prints will answer equally well, however. The prints are allowed to remain in this bath for about fifteen minutes, then removed, well washed in several changes of water, soaked for about ten or fifteen minutes in a bath of a strong solution of alum, to remove the last traces of Hypo., and then washed in running water for several hours. They are now finished, and can be dried by hanging them on a line or by pressing them between blotters; the latter is best. They can then be appropriately trimmed and mounted as desired. The writer has found it to be of an advantage to render them more pliable by dipping them in a 10 per cent. solution of glycerine in water just previous to drying them. They dry rather more slowly, but they mount much more evenly and smoothly.

Different effects can be produced by a little study of two particular parts of the process,—the printing and the toning. Deep printing and quick toning will give sepias and browns; deep printing and long toning will give purples and blacks; light printing and short toning will give light sepia tints, and light printing and long toning will give cool grays and slate tints. Various intermediate effects between these can be produced with a little experimenting. The process is comparatively easy, sure of good results, and not expensive.

## TO MOUNT THE PRINT.

It is useless for me to give any rules for the size, style, or color of mount. The use of the picture and taste of the operator should govern this.

Make a paste by *moistening* in the smallest quantity of water possible a teaspoonful of starch, and after it is thoroughly mixed pour on boiling hot water, stirring vigorously until about to the consistency of a stiff pudding.

The prints should next be placed, *face downwards*, on a plate of glass one on top of the other, and all surplus water removed by squeezing with the hand. It is necessary to get them quite dry, or the corners and edges when mounted will persist in curling up. Apply the paste with a flat brush, rubbing on a good quantity, especially around the *corners* and *edges*. Raise one edge with a penknife, pick up and lay pasted side down on the card, to your liking.

With a sheet of clean *white* paper rub the moist print down, holding firmly the lower part of paper, print, and mount together. The picture can then be put aside to be dried, spotted, and burnished.

Spotting is accomplished by simply touching white spots or imperfections with India Ink. The burnishing, by passing the print under an iron roller, and over a heated steel surface, the print being next to the heated surface.

Prints mounted with "Anti-cockling Mounting Solution" will remain perfectly flat when dry, will not cockle, bend, or twist, and do not require burnishing.

## PRINTING WITH ROMAN BLUE PAPER.

By this process the method of exposing to the light is the same as with the silver. Print until the shadows turn to a rusty color, then wash until all trace of yellow is removed. Should the picture apparently wash away and leave the paper quite white, it is evidence that it has not been printed sufficiently.

## TO DRY A NEGATIVE QUICKLY.

Soak in alcohol for five minutes, remove, place on the rack in a warm, dry place; the alcohol displaces the water in the film, and the plate will be found to dry rapidly.

## PRINTING TRANSPARENT POSITIVES.

Very beautiful glass positives for hanging in windows, etc., can be made by using the ordinary Gelatine Bromide Plates (a slow plate is preferable, as it generally gives greater contrasts). Place the negative from which you wish to make the *positive*, film side up in a printing-frame having quite mild springs, lay the gelatine plate *film downwards* on the negative, replace the back press-board, spring down gently until fastened, and hold two feet from a gas jet for exposure. As the progress of printing cannot be examined as with the paper printing, the time of exposure must be calculated; this depends on the density of the negative, the rapidity of the plate, and the strength of light.

Develop with the Oxalate of Potash formula, and fix as in negative making.

## CARE OF THE IMPLEMENTS.

Examine all parts of the camera from time to time to see that it leaks no light.

The interior of the camera and plate-holders should be carefully dusted frequently.

When the lens becomes dusty or dirty, remove from the mounting by unscrewing the ring flanges and wipe with a silk handkerchief, —if moisture is required breathe on it. *In replacing the lenses be sure that the convex sides are from the diaphragm.* When a screw becomes loosened or lost immediately make it good.

When not in use keep packed; and each article in its respective place.

## CARE OF THE PLATES.

These must positively be kept in a dry place, and, after the outside covering is off, well protected from light. In changing or handling them be careful that the hands are free from moisture, remembering that the film is glutinous. In repacking always replace the separators between each plate, and see also that they are perfectly dry; likewise the plate.



## EXPLANATIONS.

In development the plate should be entirely covered by the solution; otherwise, where it has been left uncovered, a more transparent spot will be present. Also, wherever the developer stops in flowing, a streak is left.

Should the film blister and leave the glass in any of the operations in the solutions, immediately remove from the tray and flow with an alum solution; allow it to remain a minute or so, and then proceed as before. When carrying or setting the plate-box exposed to light, it is best to take the precaution of covering it, thus avoiding the plates being damaged by any leak. It is always best to somewhat shield the parts of the camera which are most apt to leak light from direct sunlight. In changing or developing the sensitive plates, be sure not to admit any actinic light until all developed plates are protected from it. Neither should the plate be exposed to the direct rays of even a ruby, or non-actinic light, more than is necessary.

### SATURATED SOLUTION.

A solution in which the solvent has taken up, or holds in solution all of a salt that it is capable of dissolving, as an example, a saturated solution of oxalate of potash, is when the water will dissolve no more of the potash.

### ACIDITY, NEUTRALITY, AND ALKINITY.

All chemicals are in either of the above conditions; by adding an alkali to an acid, we may change it to a neutral; and from thence to the alkali, and *vice versa*; by touching with litmus paper, the color to which it will change denotes the condition of the solution: red denotes acid, and blue, alkali.

### ACTINIC AND NON-ACTINIC PHOTOGRAPHICALLY.

A light which will or will not act on the chemicals or films which are sensitive to light.

### STOCK SOLUTION.

A solution made up in quantity, from which mixtures for immediate use are taken.

### GENERAL REMARKS.

*To produce fine, clean results, care and judgment must be used.* Any particle of dust or dirt on the film of the plate, when exposed or developed, is likely to leave its impression; therefore, carefully remove all such with a brush before putting the plate into the plate-holder, and again before it is developed. If found difficult to flow the plate without stains, caused by the developer stopping in its flow, it can be wet, which is a preventive. After the plate has been once wet, always freshly wet it before changing it into any of the solutions; otherwise, small air-bubbles are likely to form on the surface.

I have found the finest negatives obtainable by a good, generous exposure and using a weak developer, but the development must be continued longer.

*A thorough washing or soaking after fixing is absolutely necessary to eliminate the Hypo. from the film. Whenever a trace of it is present, the film remains moist and "sweaty," causing it to turn yellow, and the image to fade away; remedy: Soak in water ten minutes, rinse, immerse in alum for a minute or two, again rinse, and set away to dry.*

Either in hot or cold weather, whether your plate frills or not, an immersion of the plate in a strong solution of common alum is invaluable; it toughens the film and causes it to dry quicker and harder, and with clearer shadows. BE SURE THAT YOU USE NONE BUT LIGHT-TIGHT CAMERAS AND PLATE-HOLDERS.

## PHOTOGRAPHING AT NIGHT.

By means of the Magnesium Flash Light there is furnished an opportunity for practising the art at times which are most convenient for amateurs, as a class. The *modus operandi* is simple and interesting. Owing to the local nature of the light it is more suitable for portraits and groups. Although embodying no new discoveries, practice to any extent with this light is of recent date only, and any directions which I can now give will doubtless appear incomplete and crude a year hence.

## DIRECTIONS FOR USING.

Focus the subject on the ground glass of the camera by suitable illumination with either gas or a lamp, and arrange white muslin or paper side reflectors so as to illuminate the shadow side of the sitter. Place a box of the flash powder on a piece of tin or iron (an old tin pie-plate will do very well), and then set this on some support or stand, arranged in such a manner that it will be a foot or two above the line of the head of the sitter, and sufficiently behind, or to one side of the camera, to keep the flash from shining directly into the lens. Then ignite the charge by means of a long taper, at least twelve or eighteen inches long. *This is very important, for the powder, when ignited, burns very quickly; and, if a short match is used, or the face of the operator placed near the light, severe burning might take place.* A mull screen or ground glass may be placed between the light and the sitter, to soften the shadows. It is also well to have a tin or glass reflector, of good size, in the rear of the light. The exposure is, of course, instantaneous, and no head-rest is needed.

In taking large groups, or where the sitter is at a considerable distance from the camera, more than one box of the powder may be necessary. Either portrait or landscape lenses can be used. Stops should be employed with rapid lenses.

Employ a soft developer, as for instantaneous work, one with excess of alkali.

## FURTHER FORMULA.

While I cannot give anything which I could recommend as being more safe and satisfactory for the beginner than that which has already been given in these pages, yet, as there are at present so many different formulas for all

stages of the picture's growth, with an equally strong army of devotees to each, I append a few well-tried formula for the experimentalist.

The sulphate of iron and oxalate of potash as a developer still remains a favorite with many. It may not be as energetic in its action, but the results are of a clean, transparent nature, not to be obtained with any of the many formulas I have tried. I have found that by commencing with a small amount of iron, the development is under perfect control, and almost any results can be gained. The addition of five drops of a saturated solution of citric acid to the ounce of developer, will help to prevent fog and pink stains.

## FERROUS OXALATE DEVELOPMENT.

Make saturated solutions, with HOT WATER, of Oxalate of Potash and Protosulphate of Iron. Allow them to cool and settle clear. To the Oxalate add enough of a solution of Oxalic Acid to turn BLUE litmus RED. To the Iron solution add about five drops of Sulphuric acid to the pint. These separate solutions will keep indefinitely.

For portraits and general view work, where more time can be given, one ounce of the Iron solution, added to six ounces of the Oxalate, will be found best. For *instantaneous* and very short exposures, or interiors with strong contrasts, use one ounce of the Iron solution, *added* to three ounces of the Oxalate. The development, fixing, and washing of the plate will be as described before.

### TO REDUCE AN OVER-DENSE NEGATIVE.

Take a solution of Hyposulphite of Soda, of about the strength of fixing bath, and add Oxalate of Potash developer (an old solution answers as well), until of the tint of Sherry wine. Into this put the negative, and watch until the right density is obtained; then wash well.

## NOTES AND INSTRUCTIONS

GIVEN BY

### M. A. SEED DRY PLATE CO., PYRO AND SAL SODA DEVELOPER.

#### PYRO STOCK SOLUTION.

Sulphite Soda Crystals . . . . .	6 ounces.
(Or Granulated, 4 oz.)	
Pyrogallie Acid . . . . .	1 ounce.
Water (Ice or Distilled) . . . . .	16 ounces.

#### SAL SODA STOCK SOLUTION.

* Sal Soda . . . . .	4 ounces.
(Or Carbonate of Potassium, 8 oz.)	
Water . . . . .	16 "

\* For Instantaneous Exposures, use, instead of Sal Soda, Carbonate of Potassium.

## TO DEVELOP.

Just before development add to six, eight, or ten ounces of water, one ounce of Pyro Solution, and one ounce of Sal Soda Solution, or the same of Carbonate of Potassium Solution. (See foot-note, page 30.)

NOTE.—The amount of water used depends upon its temperature. If ice-water is used six ounces will be right. If the water is over sixty degrees, eight ounces should be used; if over eighty degrees, ten ounces. We prefer cool development, as it gives the finest effect.

This developer may be used repeatedly, but will work slower and with more intensity when old. Therefore, the fresh developer is best for short exposure, and the old is better if the plate has been fully timed. In using the Sal Soda Developer it is very important to carry the development far enough, until the lights have sufficient intensity when examining the plate by transmitted light.

The quantity of Pyro must be according to the density of the negative wanted.

If the negative is too strong, use less Pyro; if not strong enough, more.

## FIXING BATH.

Alum . . . . .	$\frac{1}{2}$ oz.
Hyposulphite of Soda . . . . .	$\frac{5}{8}$ oz.
Water . . . . .	1 pint.
Filter.	

Leave the plates a few minutes longer in the bath than they require for fixing. This is important, as the permanency of the negative depends upon it.

N.B.—The Sensitometer number on the box indicates the rapidity of the plate. For instance, if you give one second for No. 22, No. 21 will require one and a half seconds; No. 20, two seconds.

## Defects in Dry-Plate Negatives and their Remedies.

### WANT OF DETAIL IN LIGHTS AND SHADOWS.

It is generally supposed to be due to under exposure, but this is not always the case. For instance, I expose a plate four seconds. It develops in from one to two and a half minutes, and the result is with the above defect. It is a proof that I have used more Pyro than the plate required. Now, I will try again. I take a plate out of the same box, give three seconds' exposure, use only half the amount of Pyro Stock Solution to the usual amount of Sal Soda Stock Solution, and the negative will develop in three or three and a half minutes; result, a fine negative in definitions and brilliancy. On the other hand, a negative may have precisely the same appearance as the foregoing one, but it took from five to ten minutes to develop. Try another, and you double the amount of exposure.



### GRANULARITY OF NEGATIVE.

This defect generally appears during the warm weather. There are two causes, — one the result of insufficient mixing of the developer before pouring over the plate, *especially if too strong and too high temperature*. REMEDY. — Dilute the developer with water one-third, or use ice-water without the dilution.

Another cause is the fixing-bath being too milky, through containing too much alum. REMEDY. — Never use a fixing-bath which is muddy. Filter it.

### FLATNESS, OR WANT OF HIGH LIGHTS IN NEGATIVE.

This generally is due to overtiming. The more rapid the plate the less latitude you have in time of exposure. A slower plate always gives a wider range. Too much Sal Soda produces flatness, also a developer weak in Pyro.

### SMALL, ROUND, SHARPLY-DEFINED TRANSPARENT SPOTS.

Some photographers wet their plates before applying the developer. If this is not thoroughly done, air bubbles will be formed on the surface, and hence cause the spots above referred to. With our plates wetting is unnecessary.

Another cause of similar spots is using water for the developer which contains vegetable-matter, causing it to bubble more or less while pouring it on the plates. REMEDY. — Use only ice or distilled water.

On account of the extreme rapidity of our plates, great care should be taken that they are developed in a suitable light.

TEST. — Expose one-half of a plate three minutes to your light in developing-room and develop. If the part exposed is as clear as the unexposed part your light is safe.

## Directions for using the "Hub" Concentrated Universal Developer.

By THE BLAIR CAMERA CO.

*To Develop.* — For a 5 × 8 plate take of Stock Solution No. 1 [PYRO], half an oz.; of Stock Solution No. 2 [ALKALI], one-quarter oz.; of water [better filtered] three ounces. Flow this over the plate, and if the image does not appear within twenty or thirty seconds add more of No. 2, a few drops at a time, until development commences; allow this to proceed without further addition until the plate has reached the proper density. This developer can be used repeatedly for a number of plates by occasionally strengthening it as the action grows weak, by adding a drachm or two of each of the No. 1 and No. 2 Solutions. When fresh it answers best for short exposures, but after having been used once or twice it will produce more contrast, and is better for over-exposed plates.

*For Over-exposed Plates.* — Restrain the action of the developer by the addition of a few drops of Bromide Solution [Bromide Potassium, 1 oz., Water, 10 ozs.]

*For Instantaneous Exposures and Under-exposed Plates.* — Use a diluted developer weak in Pyro; for instance, two drachms of No. 2, one drachm



No. 1, and four ounces of water; use plenty of solution, keep it cool, and change it several times if the exposure has been so short as to require prolonged development.

Bear in mind these three cardinal principles of development:—

*Pyro* is the developer, and gives density.

*Alkali* is the accelerator, and gives detail.

*Bromide* restrains and keeps the shadows clear.

## Directions for using The “Hub” Concentrated Hydrokinone Developer.

By THE BLAIR CAMERA CO.

TO DEVELOP.—Take of Stock Solution No. 1 (Hydrokinone), half an oz.; of Stock Solution No. 2 (Alkali), half an oz.; water, 2 ounces; and one or two drops of a 10-per cent. Solution of Bromide of Potassium. The water should be either warm or iced, according to the season, in order to give the Developer the proper temperature. The image will make its appearance rather slowly, on a properly-exposed plate, in about two or three minutes; but, once started, development will proceed rapidly and progressively to the attainment of the finest detail and any required density. The film will never become stained under the most protracted development, and, owing to the strong tanning action of the Hydrokinone, frilling, even in a warm solution, is exceedingly rare. The same conditions that govern Pyro development with regard to intensity and detail hold good in the case of Hydrokinone, an increase giving strength and dilution producing detail. Should the action proceed rather slowly toward the close of the operation, add a little more of the No. 2 Solution. The plate should then be well rinsed and fixed in Hypo, as usual.

This mixed Developer can be used over and over again for a number of plates without any addition whatever, and is suitable for ordinary negatives, line-work negatives for photo-engravers, transparencies, and lantern-slides. For the latter, as the Developer grows older, the time of exposure should be slightly lengthened. After using, this Developer can be bottled and set to one side, and will serve as an excellent “starter” for several subsequent exposures. It never fogs the plates under the most protracted development, and gives the most beautiful clearness and detail in the deepest shadows. Although the first cost is greater than that of the Pyro and Soda Developer, it is really more economical, owing to the extended use that can be made of a single mixture.

## Formulas and Directions for Working the Cramer Lightning Plates.

By G. CRAMER.

Bear in mind that very rapid plates are sensitive to light of ANY color. The safest light is a combination of a ruby and yellow, just strong enough to enable you to judge of the intensity of negative and progress of development, and the plate should not be held close to the light for examination for more than a few seconds.

The following combinations make a safe light :—

Orange-colored Paper with Ruby Glass.

Orange glass with Cherry fabric.

Ruby glass with Canary fabric.

Orange and Ruby Glass combined with Ground Glass.

Green is not as non-actinic as ruby and yellow combined, and it has furthermore the disadvantage, that with it the intensity of a negative cannot be judged so well as with the ruby light.

## DEVELOPER.

(Formula No. II.)

### ALKALINE SOLUTION.

Sulphite of Sodium Crystals . . . . .	6 ounces.
Carbonate of Sodium Crystals (Sal Soda) . . . . .	1½ “
Water . . . . .	64 “

The Alkaline Solution as well as the Sulphite of Sodium must be kept in well-stoppered bottles. If old and decomposed it will cause yellow stain.

If dried or granular Sulphite of Sodium is used, 3 ounces will be found equal to 6 ounces Crystals.

Twelve drachms Carbonate of Sodium Crystals (Sal Soda) are equivalent to 5 drachms Carbonate of Sodium dried or 6 drachms Carbonate of Potassium.

### PYRO SOLUTION.

Distilled or pure Ice-water . . . . .	6 ounces.
Sulphuric Acid . . . . .	15 minims.
Sulphite of Sodium Crystals . . . . .	1 drachm.

After this is dissolved—add Pyrogallie Acid . . . . . 1 ounce.

The solution should have a bright yellow color and smell like burning sulphur, owing to the liberation of Sulphurous Acid, which preserves the Pyro.

### TO DEVELOP.

**DURING COLD WEATHER** use 8 ounces Alkaline Solution and from 2 to 5 drachms Pyro Solution; keep moderately warm (from 65 to 70 degrees Fahrenheit).

**IN HOT WEATHER** add to 4 ounces Alkaline Solution 4 ounces cold water and from 2 to 4 drachms Pyro Solution, and keep it cool (below 60 degrees Fahrenheit).

DEVELOPER WHICH IS TOO WARM OR CONTAINS TOO MUCH CARBONATE OF SODA OR POTASSIUM WILL WORK FOGGY.

Three drachms Pyro Solution will generally be found sufficient for 8 ounces Developer to produce good intensity, IF THE PLATES ARE NOT OVER-EXPOSED AND IF THE DEVELOPMENT IS CARRIED ON FAR ENOUGH.

The Developer can be used repeatedly.

When fresh, it answers best for short exposures.

After having been used once or twice, it will work with more contrast and clearness; therefore it is well to add a little old Developer to the new. For over-exposed plates old Developer should be used, and if much over-exposed, restrain by adding to the Developer a few drops of Bromide Solution (1 ounce Bromide of Potassium to 10 ounces of water).

An under-exposed plate should be treated with diluted Developer, weak in Pyro, for instance : 4 ounces Alkaline Solution, 1 drachm Pyro Solution, and 8 ounces of water ; use plenty of Solution, keep it cool, and change it several times if the exposure has been so short as to require prolonged development.

#### FIXING-BATH.

1 pound Hyposulphite of Soda.  
1 gallon of Water.

Do not expose the plate to the light before it is fixed, and leave it in the bath a few minutes longer than apparently necessary, to insure thorough fixing.

TO PREVENT YELLOW STAINING OF NEGATIVES IT IS OF THE UTMOST IMPORTANCE TO RENEW THE HYPO BATH AS SOON AS THE SOLUTION TURNS DARK.

After fixing, place the negative in dish containing cold Alum Solution ; let it remain about 15 minutes to harden the film, then wash thoroughly.

In hot weather, when there is danger of frilling or softening of the film, use the following : —

#### FIXING-BATH FOR HOT WEATHER.

Dissolve 2 pounds Hyposulphite of Soda }  
           $\frac{1}{2}$  pound Bicarbonate of Soda    }  
          2 pounds powdered Alum       } in 2 gallons of water.

Allow it to stand a couple of days until settled, then decant the clear solution for use. This Bath will fix somewhat slower than the plain Hypo Bath, but will produce very clear negatives and will harden the film so thoroughly as to allow subsequent washing without the use of ice. It should be used in tropical climates.

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IF THE DEVELOPMENT WAS IN HARMONY WITH THE EXPOSURE, THE NEGATIVE WILL NOT NEED ANY INTENSIFYING OR REDUCING.

IF TOO THIN FROM INSUFFICIENT DEVELOPING, the negative should first be well washed to eliminate all traces of Hypo, and can then be strengthened with

#### INTENSIFYING SOLUTION.

Prepare a saturated solution of Bichloride of Mercury in water, and pour of this a sufficient quantity gradually into a solution of  $1\frac{1}{4}$  ounces Iodide of Potassium in 6 ounces water, until the point is reached when the forming red precipitate will no longer dissolve by shaking, but be careful not to add more mercury than just enough to make the solution VERY SLIGHTLY turbid. Now add one ounce of Hyposulphite of Soda in crystals, dissolve and fill up with water to make 20 ounces solution. This should be diluted with about three parts of water for use and strengthened from the stock solution as required. If traces of Hypo are left in the film, the application of intensifying solution will produce yellow stains, which may be removed by soaking the plate in weak Hypo (1 Hypo to 20 water). Be careful not to overdo the intensifying. Should it have gone too far, the negative can be reduced again by placing in fixing-bath for a short time.

Intensifying should be avoided, as the desired results can be obtained by proper development.



## FOR REDUCING INTENSITY.

Dissolve one ounce of Red Prussiate of Potash in a pint of water. Wrap the bottle in yellow wrapping-paper, as the solution is affected by light and will not keep long. Immerse the negative in Hypo Solution, one ounce Hypo to a pint of water, to which has been added a little of the above immediately before use.

When reduced enough wash thoroughly.

## THE FINAL WASHING

should be a thorough one, as the chemicals, especially the Hypo, are more difficult to eliminate from a gelatine film than from a collodion plate. To insure perfect washing, would recommend the use of a WASHING TANK, with slanting grooves for the plates, which rest on strips placed about an inch above the bottom of tank, allowing a free circulation of water underneath and around the plates. The water should enter at the bottom and overflow on top. Let the plates remain in the tank for at least half an hour in running water. If no hydrant is at hand wash an hour by changing the water often. If, through imperfect washing, the Hypo has not been thoroughly eliminated it will cause the negative to turn brown, and fade more or less rapidly, and sometimes show crystallization of the Hypo on the film when dry.

After the washing of the negative is completed, pass a clean tuft of cotton or a soft camel-hair brush over the surface, to remove any sediment from the water adhering to the film, and set aside to dry without heat. After the negative is perfectly dry it may be heated and varnished with any good negative varnish.

## FAILURES.

**FOGGY NEGATIVES.** — Caused by over-exposure; white light entering camera or dark-room; too much light during development; decomposed Pyro; introduction of Hypo or Nitrate of Silverin to the developing solution from the fingers or from tablets used for wet plates; Developer too warm or containing too much Carbonate of Soda or Potassium.

**WEAK NEGATIVES WITH CLEAR SHADOWS.** — Under-development.

**TOO STRONG WITH CLEAR SHADOWS.** — Under-exposure.

**WEAK NEGATIVES WITH PLENTY OF DETAIL IN THE SHADOWS.** — WANT OF INTENSITY, caused by over-exposure. Shorter exposure with longer development will, in most cases, produce sufficient intensity, and an addition of more Pyro Stock solution to the Developer will seldom be necessary.

**FINE TRANSPARENT LINES.** — Using too stiff a brush in dusting off the plates.

**TRANSPARENT SPOTS.** — Dust on the plate, or air-bubbles while developing.

**CRYSTALLIZATIONS ON THE NEGATIVE AND FADING OF IMAGE.** — Imperfect elimination of the Hypo.

**YELLOW-COLORED NEGATIVES** are caused by not using enough Sulphite of Sodium in developer, or if the article used is old and decomposed.

**YELLOW STAINS** are caused by using old Hypo Bath which has assumed a dark color, or by not leaving plate in Hypo Bath long enough.

**MOTTLED APPEARANCE** of negative is caused by precipitation from Fixing-Bath containing alum, if the solution becomes old, or if it is turbid.



## WEIGHTS AND MEASURES.

## APOTHECARY'S WEIGHT.

## SOLID MEASURE.

20 Grains	= 1 Scruple	= 20 Grains.
3 Scruples	= 1 Drachm	= 60 "
8 Drachms	= 1 Ounce	= 480 "
12 Ounces	= 1 Pound	= 5760 "

## FLUID.

		Symbol.
60 Minims	= 1 Fluid Drachm	f.3.
8 Drachms	= 1 Ounce	f.3.
20 Ounces	= 1 Pint	O.3.
8 Pints	= 1 Gallon	gall.

The above weights are those usually adopted in formulæ.

All Chemicals are usually sold by

## AVOIRDUPOIS WEIGHT.

$27\frac{11}{32}$ Grains	= 1 Drachm	= $27\frac{11}{32}$ Grains.
16 Drachms	= 1 Ounce	= $437\frac{1}{2}$ "
16 Ounces	= 1 Pound	= 7000 "

Precious Metals are usually sold by

## TROY WEIGHT.

24 Grains	= 1 Pennyweight	= 24 Grains.
20 Pennyweights	= 1 Ounce	= 480 "
12 Ounces	= 1 Pound	= 5760 "

NOTE. — An ounce of *metallic* silver contains 480 grains, but an ounce of *nitrate* of silver contains only  $437\frac{1}{2}$  grains.

## FRENCH WEIGHTS AND MEASURES.

## AND THEIR EQUIVALENTS IN ENGLISH.

1 Cubic Centimètre	= 17 minims nearly.
$3\frac{1}{2}$ " "	= 1 drachm.
28.4 " "	= 1 ounce.
50 " "	= 1 ounce 6 drachms 5 minims.
100 " "	= 3 ounces 4 drachms 9 minims.
1000 " "	} = 35 ounces 1 drachm 36 minims.
or 1 litre,	
= to 61 cubic inches	

The unit of French liquid measures is a cubic *centimètre*.

A cubic *centimètre* of water measures nearly 17 minims (16.896); it weighs 15.4 grains, or 1 *gramme*. A cubic *inch* of water weighs 252.5 grains.

The unit of French weights is the *gramme* = to 15.4 grains; thus, a drachm (60 grains) is nearly 4 grammes (3.88). An easy way to convert grammes into English weight is to divide the sum by 4, which gives the equivalent in drachms very nearly thus: —

Grammes.	Drachms.	Oz.	Drachm.	Grains.
100 ÷ 4	= 25	= 3 .	1 +	43

## Contact Printing with Permanent Bromide Paper.

BY GEO. EASTMAN, OF THE EASTMAN DRY PLATE AND FILM CO.

*Light.* — In contact printing with Permanent Bromide Paper the exposure is preferably made by artificial light, to insure uniformity and to avoid over-exposure.

*The Dark-Room.* — Yellow post-office paper is the best medium for filtering the light through for working Permanent Bromide Paper; two thicknesses should be used for daylight, and one for gas or kerosene.

*Sensitiveness.* — Permanent Bromide Paper is about one-half as sensitive as a Collodion wet plate, or one-twentieth as sensitive as a good dry plate, and should be exposed accordingly.

*Exposure.* — The exposure varies with the intensity of the negative and the quality and intensity of the light, but may be approximately stated to be, using as thin a glass or American film negative as will make a good print, one-quarter second by diffused daylight, or ten seconds at a distance of one foot from a No. 2 kerosene burner; with an oiled paper negative it requires twice as much, and with an unoled paper negative about three to five times as much exposure. Very thin negatives should be printed by weak yellow light, like that obtained from a kerosene lamp turned down a little below the normal intensity. In this way a strong, vigorous print may be obtained from a negative that would otherwise be too thin and flat. Strong, intense negatives are best printed by daylight.

### THE DEVELOPER.

#### FORMULA.

##### No. 1.

Oxalate of Potash . . . 1 lb.  
Hot Water . . . . 48 oz.  
Acetic Acid . . . . 3 drams.

##### No. 2.

Proto-Sulphate of Iron . . . 1 lb.  
Hot Water . . . . . 32 oz.  
Acetic (or Citric Acid,  $\frac{1}{4}$  oz.),  $\frac{1}{2}$  dram.

##### No. 3.

Bromide Potassium . . . 1 ounce. Water . . . . . 1 quart.

These solutions keep separately, but must be mixed only for immediate use.

*To Develop.* — Take in a suitable tray — No. 1, 6 ounces; No. 2, 1 ounce; No. 3,  $\frac{1}{2}$  dram.

Soak the exposed print in clean water until limp, then pour off the water and flood with the developer, taking care to avoid bubbles.

The image should appear slowly, and should develop up strong, clear, and brilliant. When the shadows are sufficiently black, pour off the developer and flood the print with the

#### CLEARING SOLUTION.

Acetic Acid . . . . . 1 dram. Water . . . . . 32 oz.

*Do not wash* the print after pouring off the developer and before applying the clearing solution.

Use a sufficient quantity to flow over the print, say 2 ounces for an  $8 \times 10$ . Allow it to act for one minute, and then pour it off and apply a fresh portion; repeat the operation a third time, then rinse in four changes of pure water, and immerse for ten minutes in the

## FIXING—BATH.

Hyposulphite Soda . . . 3 ounces. Water . . . . . 16 ounces.

After fixing, wash thoroughly two hours, in at least twelve changes of water, and hang up to dry. Use fresh developer for each batch of prints. With a glass-bottomed tray, seven ounces of developer are sufficient for a  $25 \times 30$  print.

*Object of Clearing Solution.* — The object of the clearing solution is to prevent the precipitation of the iron from the developer in the fibre of the paper. This can only be done by keeping the paper acid while washing out the developer.

*Citric Acid* may be used instead of Acetic in the clearing solution, in which case use  $\frac{1}{8}$  ounce to the quart of water. Citric Acid is less liable to cause blisters.

*Blisters* sometimes appear in Bromide Paper, and may be avoided by using a little common salt in the first washing-water after fixing. The Hypo must not be stronger than three ounces to the pint of water.

*No Toning Required.* — With the Permanent Bromide Paper the final tones are obtained entirely by development, and range from a soft gray to a rich, velvety black, depending somewhat upon the density of the negative and the quality of the light used in printing.

*Clean Dishes, Clean Hands.* — The faintest trace of Hyposulphite of Soda or of Pyrogallie Acid is fatal to good results with Bromide Paper, and the operator cannot be too careful to avoid any contamination. The tray used for developing with oxalate should never be used for anything else.

*To avoid Yellow Prints* four things are absolutely necessary:—

FIRST. — The developer must be acid.

SECOND. — The clearing solution must be used as directed.

THIRD. — Fresh Hypo solution is required for fixing each batch of prints.

FOURTH. — The washing must be thorough after fixing.

*Mounting on Card.* — Permanent Bromide Prints may be mounted wet or dry; the prints should *not* be dried between blotters like albumenized paper, but should be hung over a line, or laid, back down, upon glass or clean paper. To mount, brush over the back with thin starch paste, lay the print on the mount, and rub into contact with a soft cloth.

*Enamelling.* — Prints on smooth paper may be given a beautiful polished surface, superior to that obtained by burnishing, in the following manner: Sprinkle the surface of a glass plate with powdered French chalk, rub it evenly over the surface with a tuft of cotton wool, continuing to lightly rub it until the chalk is all removed, then coat the glass with the following

## COLLODION.

Soluble Gun-Cotton	. . . . .	48 grains.
Alcohol	. . . . .	4 ounces.
Sulphuric Ether	. . . . .	4 ounces.

As soon as the collodion is well set, wash until all greasiness disappears; then slide the plate, face up, into a tray of water, in which is floating, face down, the permanent bromide print, which has just been fixed and washed; grasp the plate and print by one end, and lift together from the water, avoiding bubbles, and draining the water from the opposite end; squeegee the print into contact with the plate, and set away to dry. Before the print is quite dry apply a coat of starch paste to the back. After drying, the print can be peeled off from the glass by cutting through to the star, near the margin of the paper, all round, and lifting one corner, and the face will present a polish almost as high as the surface of the glass from which it has been removed. The print is then ready to mount, as follows: Moisten the face of the mount with a damp sponge and lay upon it the print; rub down with a soft cloth and put under pressure to dry.

The addition of five per cent. of glycerine to the paste will prevent the print peeling off the glass as it dries.

*Another Method.* — Squeegee the wet print, face down, on a polished piece of hard rubber or ebonite; when dry, the print will peel off with a fine polished surface. The print should be slipped on to the rubber plate under water to avoid air-bells. This method will answer where prints are not to be mounted.

*Flexible Prints.* — Permanent Bromide prints soaked in a mixture of glycerine, five ounces, and water, twenty-five ounces, and dried, will not curl, and may be used for book illustrations unmounted. The heavier papers are especially adapted for this purpose.

*Straightening Unmounted Prints.* — After drying, prints may be straightened by the scraping action of a sharp-edged ruler applied to the back; the corner behind the ruler being lifted as the ruler is passed along.

## ENLARGING APPARATUS.

The operation of enlarging on Permanent Bromide Paper involves the same principles as making a negative; it is simply photographing, on a large scale, the negative instead of the original. To avoid the necessity of using a large camera the dark-room itself is made to take the place of the camera body, and the negative is placed in an opening in the dark-room shutter, so that all the light will come through it to the lens. See Fig. 1.

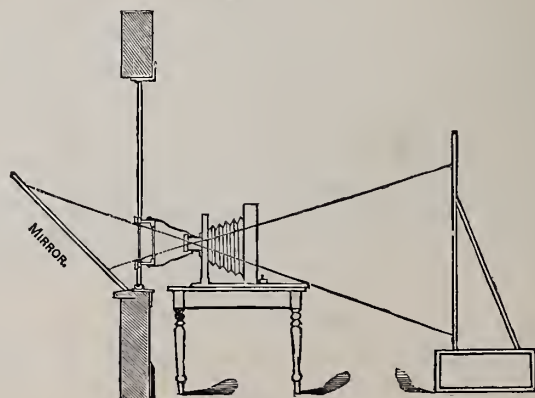


FIG. 1.



## AN IMPROVISED APPARATUS.

Fig. 1 represents an enlarging apparatus that any photographer can improvise from ordinary apparatus and material, with the expenditure of a few hours' time. To construct it proceed as follows:—

Cut a hole in the dark-room shutter two sizes larger than the largest negative to be enlarged from; fit into the opening a frame about two or three inches deep, glazed on the outside with a sheet of ground glass. On the inside edges of the frame, top and bottom, arrange grooves in which to slide



FIG. 2.

the negative; when the negative is in position it will be brilliantly illuminated against the ground glass. Now, on a table or shelf, adjusted in front of the negative box, place an ordinary camera having the ground glass removed, point the lens toward the negative, and connect the lens and negative-box by means of a bag of opaque cloth, open at both ends and provided with elastic bands to close it tight around the lens and negative-box. This will prevent any light coming into the dark-room except through the lens. See Figs. 1 and 2.

In this apparatus the camera body serves no useful purpose; all that is required is to support the lens. In case a portrait-lens is used it should be put in position so that the back lens will be next the negative instead of as shown in the cut.

The easel to hold the sensitive-paper is the next requisite, and this may be constructed by fastening a large, flat board in an upright position, upon a box of suitable size to serve as a base, so that the whole may be moved to and fro to regulate the size of the enlargement. The face of the easel should be covered with white paper. Now, if the easel is put in position, facing the camera, the image can be focussed on the screen by sliding the camera backward or forward on the shelf.

The size of the enlargement will depend upon the length of focus of the lens, and the distance the easel is set from the negative. The following table will give an approximate idea of the distance required for the apparatus to work in:—

## TIMES OF ENLARGEMENT.

TOTAL DISTANCES FROM NEGATIVE, IN INCHES.

Focus of Lens	2 times.		3 times.		4 times.		5 times.	
	To Easel.	To Camera.	To Easel.	To Camera.	To Easel.	To Camera.	To Easel.	To Camera.
6 inches.	27	9	32	8	$37\frac{1}{2}$	$7\frac{1}{2}$	49	7
8 "	36	12	$42\frac{2}{3}$	$10\frac{2}{3}$	50	10	$65\frac{1}{2}$	$9\frac{1}{2}$
10 "	45	15	$53\frac{1}{3}$	$13\frac{1}{3}$	$62\frac{1}{2}$	$12\frac{1}{2}$	$81\frac{2}{3}$	$11\frac{2}{3}$
12 "	54	18	64	16	75	15	98	14

From the above table it will be seen that the total distance required for working the easel when making a six-times enlargement and using a 12-inch lens, is less than ten feet. For heads from cabinet negatives a six-inch focus lens is quite large enough, and when such a lens is used for life-size heads, they can be made in a space of less than *five feet*.

## THE LENS.

Any lens that will make a negative can be used for enlarging, and the proper size for the lens depends wholly upon the negative to be enlarged from, and not at all upon the enlargement to be made. If the lens will cover the negative, it will make an enlargement from it of any size.

For enlarging from negatives 5×8 inches and under, a half-size portrait lens is suitable. It can be worked nearly wide open to heads, but will have to be stopped down for half and full-length figures. Rapid rectilinear lenses are also suitable, but, of course, do not work quite as quick on heads as portrait lenses, because they have not as large aperture, but they should be used in preference to others for enlarging groups, landscapes, mechanical drawings, etc. For full and half-length figures they are quite as rapid, because for this purpose the portrait lens requires to be stopped down as far as the rapid rectilinear.

## A COMPLETE APPARATUS.

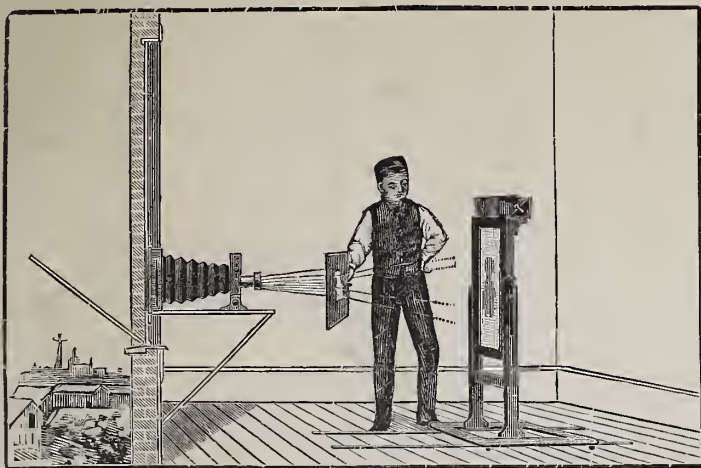


FIG. 3.

While the foregoing directions will enable any one to construct a practical apparatus for enlarging, many will prefer a more convenient and finished outfit, and for such the following apparatus has been devised. See Figs. 3 and 4.

*The Camera.* — The Camera is similar to an ordinary "front focus" View Camera, except in the back, which has a fixed ground glass and a carrier for the negative, which slides into the camera inside the ground glass. This carrier is adjustable so that it will take any negative from  $3\frac{1}{4} \times 4\frac{1}{4}$  inches, or smaller, up to and including  $8 \times 10$  inches. Provision is made in the back for making a light-tight joint around the opening of the dark-room shutter, into which the camera fits.

*The Easel* consists of a base, supporting two uprights, in which slides the exposing screen. On the face of the screen swings a hinged frame, which clamps the sensitive-paper flat in position. The swinging frame is arranged to receive smaller frames or kits, adapted to clamping any size of paper. On the top of the screen is a light-tight box, provided with bearings, in which revolves the spool, carrying the roll of sensitive-paper. Each box is supplied with a wooden spool, and the paper is wound for the market upon a

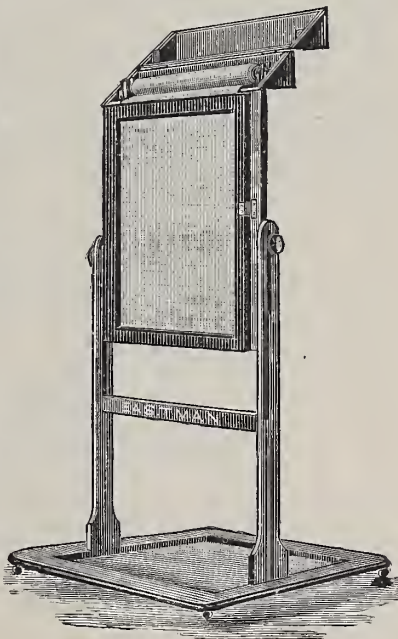


FIG. 4.

strong paper tube, which slides on to the wood spool. Thus, a tube carrying any width of paper, not above the capacity of the easel, can be used with the same box.

### THE LIGHT.

*Daylight.* — A long series of experiments, with various kinds of light, have proven that except in cases where a large number of enlargements are to be made each day, daylight is the best.

The only drawbacks to daylight are, that it is not available at night, and that it varies in its intensity, rendering the timing of the exposure somewhat difficult. This last objection can be overcome, however, by always trying a small piece of paper on each subject before making a large print.

The use of daylight requires no expensive condensers, and the apparatus is less elaborate than for artificial light.

A mirror 30 inches long by 24 wide, at an angle of  $45^\circ$ , will reflect the sky, and give a much more uniform, and even light, than any opaque reflector, being very nearly equal to having the negative looking directly to the sky.

When the camera is set up for daylight, unless it commands an unobstructed view of the horizon, a reflector of white cloth or paper, or better still, the mirror, as suggested before, should be arranged outside the window, so as to throw the light from above on to the ground glass. In Fig. 1 the reflector is shown rather small in proportion, and too close to the outside wall; it is shown better in Fig. 2. To ascertain whether it is in its proper place take out the lens and examine the ground glass from inside the dark-room; if it appears evenly illuminated it is sufficient. No harm will result if the sun shines on the ground glass and reflector, provided it strikes evenly; if the light is too strong, the lens can be stopped down; when a mirror is used, it should be covered with white paper when the sun strikes it.

*Electric Light.* — When a large quantity of work is to be provided for, the arc electric-light is most convenient, as it is powerful and (practically) uniform. Any artificial light requires a pair of double condensers, and they should be arranged as in Figs. 5 and 6.

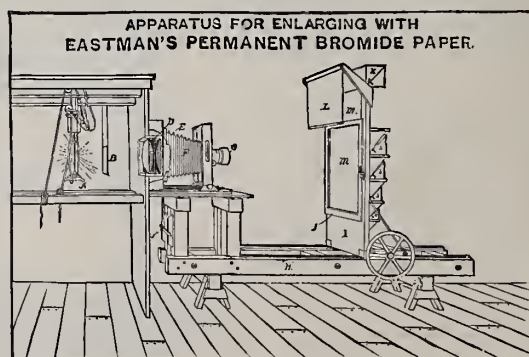


FIG. 5.



## ENLARGING APPARATUS FOR ELECTRIC LIGHT IN USE IN THE EASTMAN FACTORY.

Large condensers if made of fine glass are very expensive, but an inferior grade that cost only a moderate sum may be used if a sheet of very fine ground glass be mounted between the convex surfaces of the two lenses. (See Fig. 6.)

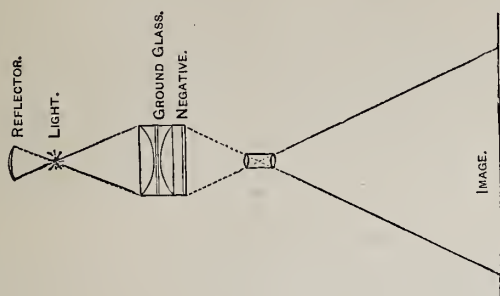


FIG. 6.

Some may object that, theoretically, this is not the proper way to use condensers, to which we would reply that for this particular purpose it is the *practical* way, as we know by extended experience. It is suggested, of course, only for large condensers.

The electric-light giving a stronger light than is actually required, the loss caused by the ground glass is no detriment. A concave reflector may be used behind the light if required. It is seldom found necessary in practice, except with very dense negatives. It is obvious that the condensers must be large enough to cover the negative, or, in other words, the diameter of the condensers must be greater than the *diagonal* measurement of the negative.

All artificial light produces a harsher chemical effect than daylight.

*Oxyhydrogen Light.* — This light may be employed instead of the arc electric-light, and it gives about the same results.

*Gas and Kerosene* are not powerful enough for enlarging, except on a small scale.

*Magic Lanterns* with oil-burners will answer for enlarging from card negatives up to three or four times, but no lantern is suitable unless it has double condensers and a powerful burner.

Having described the apparatus employed, we will now proceed with the

## OPERATION OF ENLARGING.

*The Image.* — Shut out all extraneous light from the dark-room, slide the negative (upside down, face toward the lens) into its place near the ground glass, adjust the easel at the proper distance, and without any stop in the lens, focus the image upon the white paper on the face of the easel. (A sheet of white paper should be pasted on the face of the easel when it is set up.) The image should show plainly on the screen; if too large, move the easel closer and focus again; if too small, *vice versa*. The image should be made

to register properly in the frame on the easel by sliding the negative in the carrier crosswise, and by raising or lowering the front of the camera carrying the lens. In case condensers are being used, the lens must remain in the axis of the condensers and the vertical adjustment obtained by raising and lowering the easel board.

*Trial Exposures.* — For example, we will suppose that the negative is a cabinet head, and it is desired to make a life-size print from it, using a half-size portrait lens: in this case no stop will be required in the lens, unless the light is very strong. To proceed to the exposure, cap the lens and pin upon the screen where the head comes a small piece of the Permanent Bromide Paper. Provision should be made for a non-actinic yellow light in the dark-room at this time; screen the yellow light, uncapped the lens, and allow the exposure, if the day is clear, to continue for, say fifty seconds. Cap the lens, and develop the trial exposure as directed for contact printing. If the image comes up dull and full of detail it is over-timed; if weak and without detail, it is under-timed; in either case try another piece, and give more or less time as required. Under different conditions the time required varies from five seconds to five or ten minutes, depending on the light, the density of the negative, the aperture of the lens, and upon the size of the enlargement. These conditions all vary with each operator, but a few trials will narrow the exercise of judgment down to the intensity of the light, and usually one trial exposure will give a guide to that.

A strip of paper eight or nine inches wide, cut off from the end of a twenty-inch roll, will make three trial pieces large enough for the purpose.

*Vignetting.* — Having ascertained the exposure required, swing open the frame on the face of the easel, open the roll-box and pull out sufficient paper to reach half an inch below the inside edge of the bottom rail of the frame, hold the paper with one hand and close the frame on to it with the other — the clasp will hold it when firmly closed. Next turn outward the button stops in the roll-box and shut down the cover. The stops prevent the cover creasing the paper where it leaves the box. The sensitive-paper will now be protected, except inside the frame where the image falls.

The operator standing at the left of and half facing the easel should screen the lens with a piece of straw board about 16 × 20 inches, having a hole of proper shape for the vignette, cut in the centre. Having uncapped the lens the vignetter should be moved back and forth from the lens toward the easel, so as to allow the head and shoulders of the image to appear on the screen. The movement out should be sufficient to show the image almost to the edge of the kit, and in far enough to cut close to the head and shoulders. This movement to and fro should continue through the entire exposure, which should not be less than twenty or thirty seconds, the lens being stopped down, if necessary, to get sufficient time to operate the vignetter.

To get a soft, evenly blended vignette requires some little practice, but the knack once acquired it becomes quite easy.

*Extra Printing.* — Faces and light drapery often require, to get detail, extra time in exposure. This is accomplished by using a card having a smaller hole after vignetting, and passing it over the portions requiring the extra time. By keeping the spot of light moving, almost any amount of additional detail may be obtained locally. Occasionally in a half or full-length subject a hand may require less exposure than the rest of the picture; in this case a small piece of card-board, cut to the proper shape and stuck on the end of a knitting-needle, can be used to screen that part of the image.

The paper lends itself to innumerable dodges, which may be practised in a similar manner, the operator being able to see just what he is doing from his position near the easel.

*The development* is the same as has been described for contact printing.

*Mounting on Cloth.* — Cover an artist's stretcher-frame with a piece of common white muslin, by stretching it tightly while dry and tacking it on the outside edges. Give the cloth a coat of starch paste, rubbing it well in and avoiding streaks and lumps, lay over a smooth table a piece of rubber sheeting, lay the wet print on the rubber cloth, face down, and with a rubber squeegee scrape off the water. Give the back of the print, as it lies on the rubber cloth, a coat of the paste, and then lay the stretcher, face down, upon it, and rub the muslin into contact with the back of the print, using a thin paper-knife to reach under the edges of the frame. Lift the frame and rubber-cloth from the table together, and peel the rubber off from the face of the print. This will leave the print on the stretcher smooth and flat. When dry it will be as tight as a drum-head.

*Mounting on Card.* — Employ the same method as that used in mounting contact prints.

## HINTS.

*Mealy Mottled Prints.* — Over-exposure and short development.

*Greenish Tones* are obtained by over-exposure and too much bromide.

*Forcing Development* does not give good results for the above reason.

*Face of Permanent Bromide Paper* can always be distinguished by its curling in. Convex side is always the back.

*Fixing.* — The operator can tell when a bromide print is fixed by looking through it or upon it in a good light, unfixed portions will be greenish yellow.

*Yellow Prints.* — Prolonged development will cause yellow prints by depositing iron in the paper. The Exposure must be correct so as to allow of quick development.

*Running Water* is not so sure a means for washing prints as changing them from one tray to another, allowing them to soak at least ten minutes in each fresh water; twelve changes are sufficient; no less.

*Retouching Negatives.* — Coarse grinding for retouching should be avoided, and the retouching "burned in" to the varnish over a spirit lamp to avoid having the scratches show in the enlargement.

## DON'T.

*Don't* use old Hypo for fixing.

*Don't* use the developing dish for fixing.

*Don't* put the prints between blotters to dry.

*Don't* fail to rock the tray well while developing.

*Don't* rock in one direction only, unless you want streaky prints.

*Don't* fail to lift the print up and turn it over in the clearing solution.

*Don't* let a jet of water play on the paper while washing; it will cause blisters.

*Don't* use old developer on large prints for the sake of economy; use it fresh every time.

*Don't* use twice as much acid as directed in the developer or clearing solution; enough is enough.

*Don't* expect that the light reflected from a red brick wall will be sufficient for enlarging. Unless your enlarging window has an unbroken horizon use a reflector, Figs. 1 and 2.



## TRANSFEROTYPE PAPER.

Contact or enlarged prints are made upon this paper in precisely the same manner as upon the "Permanent Bromide Paper."

By this process opals, window, and lantern transparencies can be made at a trifling cost.

### DIRECTIONS FOR USING TRANSFEROTYPE PAPER.

Expose, develop, fix, and wash the print on Transferotype Paper the same as directed for Permanent Bromide Paper, *taking care that no alum is allowed* in any of the solutions, as that would prevent the transfer. After washing the print is ready for

*Transferring.* — Lay the wet print face down upon the object to which it is desired to transfer the print. The surface may be polished or ground glass, porcelain, wood, prepared canvas, ivory, or any substance which will withstand the action of hot water, and allow the image to adhere. It must be perfectly clean and free from grease or oil. Squeegee the wet print carefully into contact with the surface, and put it under a blotter and weight to dry. When dry pour hot water upon the back of the picture until the paper blisters, or until one corner can be lifted with a pin; then gently pull the paper away. After removing the paper, gently rub the surface of the picture with a tuft of cotton, moistened with warm water, and set away out of reach of dust to dry.

The paper may be stripped any time *after* it has been *thirty minutes* under the blotter, but it is safer to allow it to thoroughly dry.

The proper temperature for the hot water depends greatly upon whether the paper is dry or not; if dry it should be about 180° Fahr.; if only thirty minutes has elapsed after squeegeeing down, the water should be about 130° Fahr., and the temperature gradually raised by the addition of boiling water until the paper blisters.

*Thirty Minutes* is the least time that should be allowed for drying; otherwise there is danger of the picture leaving the support.

*Clean Dishes, Clean Hands.* — The faintest trace of Hyposulphite of Soda or of Pyrogallie Acid is fatal to good results in developing Transferotype paper, and the operator cannot be too careful to avoid any contamination. The tray used for developing with oxalate should never be used for anything else.

*Glacé Prints.* — Contact prints made on *Transferotype Paper* have a brilliant, glossy surface, and may be mounted and used as ordinary bromide prints without burnishing.

*Lantern Slides* may be printed by contact, using lamp or gas-light, or in the camera using daylight.

Prints intended for transparencies should be developed further than a print that is to be viewed by reflected light; in the former case the progress of development must be examined by looking *through* the print, and in the latter by looking down upon it as it lies in the tray. Many photographers have a large amount of lantern slide-glass remaining from failures in making slides on dry plates, this glass can be made use of in this process.

*Window Transparencies*, enlarged or contact prints, should be transferred to a clear glass, and backed up by a piece of ground glass.



*Opals* for framing, or for window transparencies, are made by transferring the picture to the ground surface of opal glass.

*Placques, Tile, Lamp Shades*, and various articles may in a like manner be decorated either as a basis for water-color work or simply for the photographic effect; such articles when given a coat of damar varnish and heated in an ordinary oven will bear washing.

*Engraver's Blocks.* — Transferotypes can be put on wood blocks for engraving. The film being only 1-4000 of an inch thick it does not interfere with the graver. For very fine work the image may be ground still thinner by means of dry powdered pumice-stone. The image being stronger and clearer than produced by any other process, the results are correspondingly better.

After the transfer has been dried on the block, a little glycerine wiped over it with the finger will cause it to cut smoothly under the graver and with no tendency to chip.

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# REASONS WHY BLAIR'S REVERSIBLE BACK CAMERAS ARE SUPERIOR TO ALL OTHERS.

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They are constructed to receive our Patent Extension for making negatives larger than the Camera proper. No fitting or extra charge is made as is the case when putting our Patent Extension on Cameras of other's make.

## OUR ADJUSTER AND PLATE-HOLDERS

are attached by a system of grooves and springs which leave no screw or pin sticking out above the surface to scratch and injure the polish or hands. These Cameras are fitted with our popular Patent Reversible Adjuster, having

## SPRING ACTUATED GROUND-GLASS FRAME.

This method of removing the ground-glass frame from contact with the Camera, and keeping the Plate-Holder in position during exposure, is superior to all other methods. No better evidence of this fact is needed than the attempts of other manufacturers to copy it.

All Spring Actuated Ground-Glass Frames movably fixed to allow the Plate-Holder to be placed behind the frame are infringements on our patents, and persons manufacturing, or causing to be manufactured, or selling adjusters, or adapters (so called) other than those bearing our stamp, will be held responsible for such infringement.

## OUR CAMERAS

possess a greater focussing capacity (length of bellows) than any others, thus enabling the operator to use any make or style of lens without Extension fronts. Dealers in photographic apparatus say they are not asked to exchange our Cameras, because they are found to meet all the requirements of the photographer, whether amateur or professional.

## OUR APPARATUS

is made on a system of interchangeable parts which are never found to vary. The above facts of superiority in utility in connection with the beauty of style, designs, and finish, and superior quality of workmanship, place Blair's Cameras ahead of all others.

Ask to be shown the latest styles, and insist upon seeing them.

**THE BLAIR CAMERA CO.**